Paper
TRADE JOURNAL

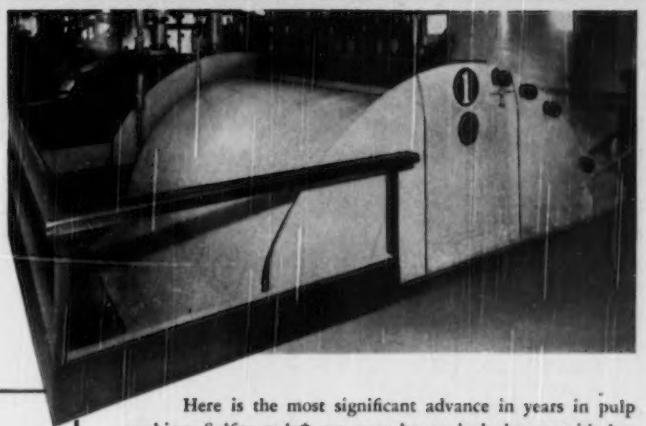
Nov. 23, 1950

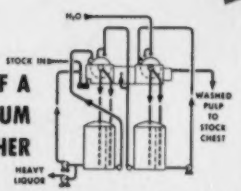
CAN THE COST OF YOUR REFINING OPERATIONS BE REDUCED?

WHAT ABOUT MACHINE COATED LIGHTWEIGHT GRADES?

WHAT IS THE SUPERINTENDENTS POSITION IN THE PRESENT CRISIS?

Cleaner Sulfite Pulp with Less Wash Water





FLOW SHEET OF A TYPICAL 2-DRUM 4-STAGE WASHER

Swenson-Nyman Pulp Washers actually cost less installed, because each drum provides two washing stages. This reduces the number of drums required, as well as the amount of auxiliary equipment.

Here is the most significant advance in years in pulp washing. Sulfite pulp* can now be washed cleaner with less water, on Swenson-Nyman Pulp Washers. Each drum provides 2-stage washing, and the entire system is totally closed.

Using two drums with a repulper between (flow sheet shows resulting 4-stage operation) the sulfite stock emerges cleaner, while the recovered liquor carries a higher percentage of total solids to evaporators, alcohol plant or other recovery process.

Send for Bulletin E-108 which fully describes this and other Swenson equipment for pulp mills.

*Also soda and sulfate pulp

SWENSON
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SWENSON EVAPORATOR COMPANY
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- Evaporators
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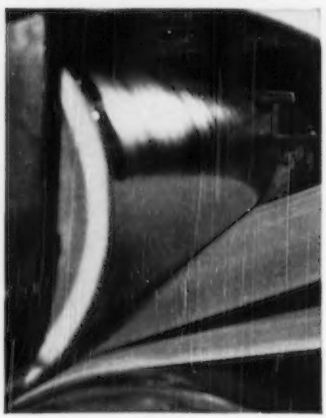
- Digester Blow Condensers
- Surface Condensers
- Turpentine Condensers • Causticizers

Efficient water removal means:

Longer Felt Life
Less Down-Time
Increased Production
Greater Profits

In one mill after another, Downingtown Suction Press Rolls have proved that vertical water removal pays off in longer felt life, less down-time, and higher machine speeds. Plain press rolls extract the water horizontally, forcing it back through the web of paper and the felt, against the direction of the run. This disturbs the formation, and tends to fill up the felt. Mill data show clearly the advantages of the suction method.

For example, before a recent installation on a Harper-type Fourdrinier, the top speed on 12-13 lb. napkin stock was 450 FPM, because crushing and pin holes developed at the press when this speed was exceeded. A 22-inch rubber-covered Downingtown Suction Press Roll permitted operation at 700 FPM, and gave a 90% increase in felt life. No other changes or additions were made to the machine. Forming and drying capacities limited the speed to 700 FPM—not press capacity.



Efficient vertical water removal shown by absence of water at incoming side of press

In another mill that is producing facial, a Downingtown Suction Roll allowed a speed increase from 700 to 1200 FPM. Again press was not the limiting factor. Prior to the installation, felts had to be washed three times each 24 hours. Felt life average was seven days. Since installation, no washing of felts during runs is required, and felts now average 16 days, a life increase of well over 100%, at an increase of 70% in speed.

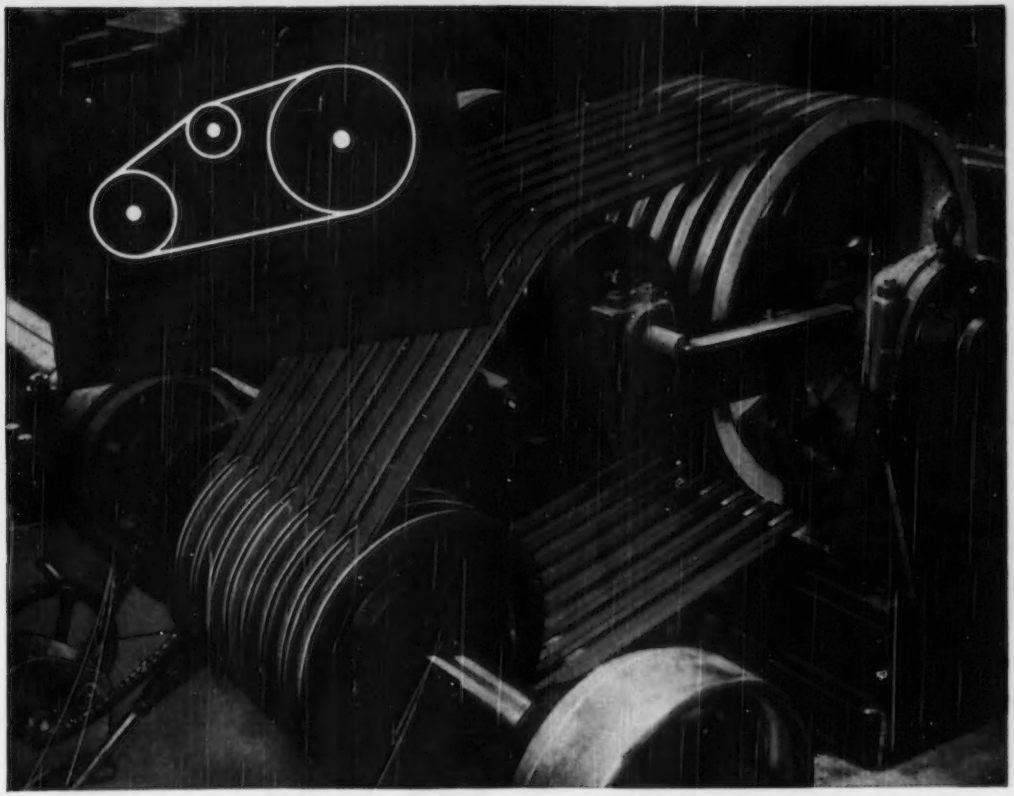
These are not exceptional cases, but are exactly the kind of results you can expect in your mill. We'd like to tell you more about Downingtown Suction Press Rolls and the rest of our complete line of suction equipment. Write us.

DOWNINGTOWN MANUFACTURING COMPANY

DOWNINGTOWN, PA.

Pacific Coast Representative: JOHN V. ROSLUND, Pacific Bldg., Portland 4, Ore.

DESIGNERS AND BUILDERS OF PAPER AND BOARD MAKING MACHINERY SINCE 1880



Synchronize Paper Machine Sections

WITH MOTION CONTROL **VARI-PITCH DRIVE!**

VITAL SPEED CORRECTION for operation of Fourdrinier paper machines is provided through Motion Control *Vari-Pitch* drives. Each machine section is kept in synchronism with the others.

A weighted idler on the above drive keeps the belts in proper tension. Simple turn of the handwheel, conveniently located, increases or decreases the diameter of the driving sheave, providing necessary speed differential.

Adjustment can be made at the machine section or by remote control. An electric pilot motor with push button control may be provided for changing speeds to synchronize each section.

Adjustments, without hazard to equipment or operators, are *positive*, providing correct speed until changed.

For modern paper making operations, *mechanical control* through use of adjustable *Vari-Pitch* sheaves have proved most economical through years of successful, low-cost performance.

In new installations or in converting old machinery, *Texrope* drives can speed up your operations and save you initial and long-run investment. Call your nearby A-C Sales Office or write for bulletin 20B6082.

A-3167

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Sold . . Applied . . Serviced

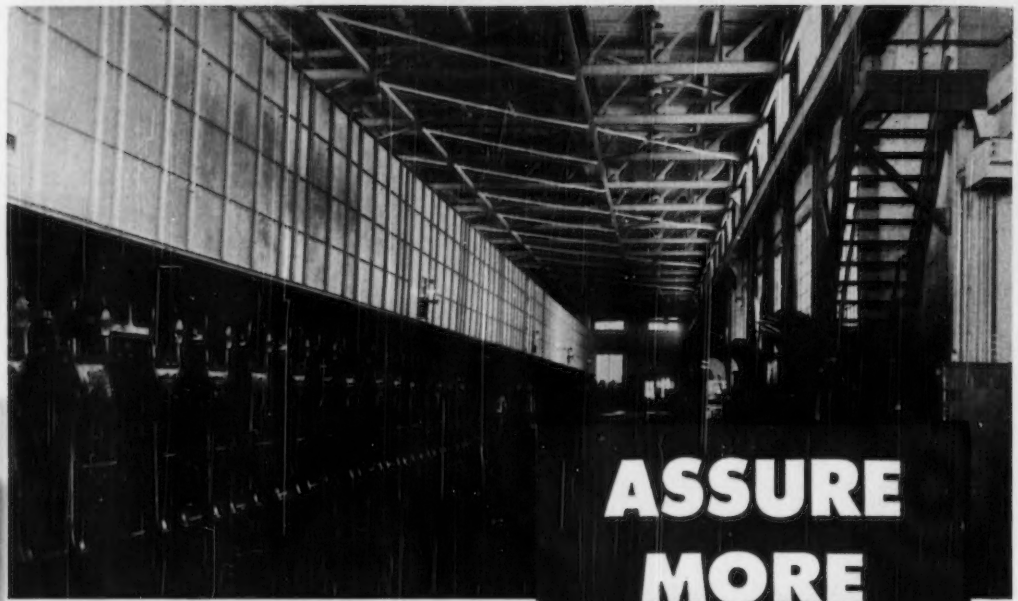
by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS



ASSURE MORE PAPER AT LOWER COST

Avoid unscheduled stoppages and bearing replacements by using TEXACO URSA OIL X**

Unequalled for keeping oil lines and bearings on paper machines clean . . . free of paper dust, carbon and water . . . *Texaco Ursa Oil* X** virtually eliminates unscheduled shutdowns. This saves you costly bearing replacements, and assures full production.

With *Texaco Ursa Oil* X** you can count on effective lubrication and full bearing protection on your dryer rolls. This unequalled lubricant resists oxidation, foaming and sludging, and offers sure protection against rust whether machines are active or idle. *Texaco Ursa Oil* X** is highly recommended by leading paper machine and bearing manufacturers.

To reduce wear and maintenance costs on your enclosed gear drives, use *Texaco Meropa Lubricants*. They combat oxidation and thickening, do not foam, and carry heavy loads easily.

A Texaco Lubrication Engineer will give you full details on both of these cost-saving lubricants. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

FOR THE PAPER INDUSTRY

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station

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DATES TO REMEMBER

NOVEMBER 24-25: American Physical Society, Div. of High-Polymer Physics, 8th Meeting, University of Chicago & the Museum of Science & Industry.

NOVEMBER 27—DECEMBER 2: 19th National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York, N. Y.

DECEMBER 3-6: American Institute of Chemical Engineers, Neil House and Deshler-Wallick Hotel, Columbus, Ohio.

JANUARY 15-18, 1951: Plant Maintenance Show & Conference, Public Auditorium, Cleveland, Ohio.

JANUARY 24-26: Canadian Pulp & Paper Assn., Mount Royal Hotel, Montreal, Que.

FEBRUARY 19-22: Technical Assn. of Pulp & Paper Industry, Annual Meeting, Hotel Commodore, N. Y. C.

FEBRUARY 19-22: American Paper & Pulp Assn., Annual Meeting, Waldorf-Astoria Hotel, N. Y. C.

NEXT WEEK

University of Maine Issue

We are pleased to present as a special issue the Industrial Lectures on Pulp and Paper Making of the University of Maine.

These lectures, started in 1948, bring to students majoring in pulp and paper subjects, the latest in operations as well as technical developments.

From the results achieved, the University has been able to bridge the gap which so often divides the theoretical from the practical. The lecturers drawn from many of America's leading mills have added greatly to our knowledge of the "why" of pulp and paper making.

Anyone connected with the manufacture, sales, conversion or use of pulp or paper will benefit from this concise study of the manufacturing methods of our fifth largest and most important industry.

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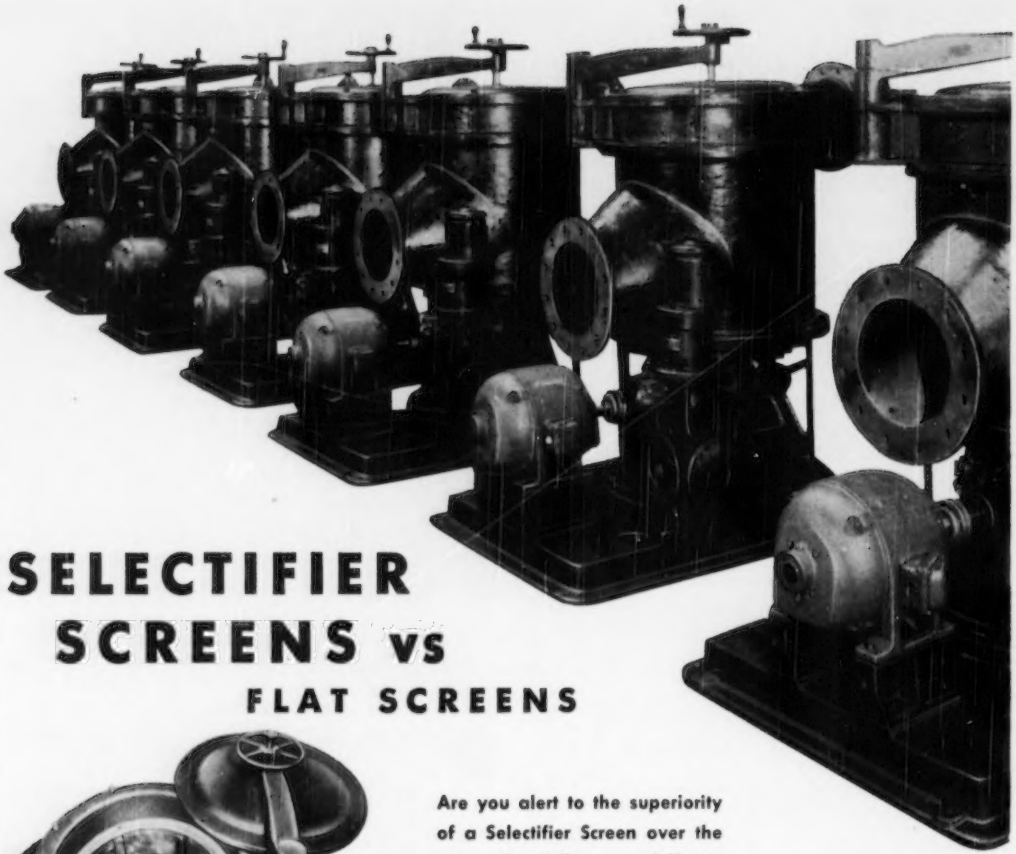
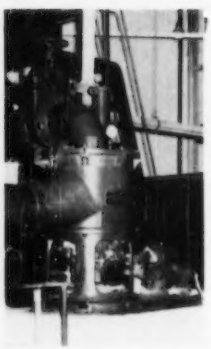


SELECTIFIER SCREENS vs FLAT SCREENS

Are you alert to the superiority of a Selectifier Screen over the conventional flat screen? If not, here is a "quickie" on the subject.



- Totally-enclosed.
- Operates under pressure.
- Performs final cleaning operation.
- Requires little floor room.
- Installation immediately ahead of both liner and filler vats, replacing large, sloppy flat screens or ahead of Fourdrinier head boxes.
- Cost in line with flat screen costs. Already in service in mills running

Calender, index	Boxboard liner	Crepe Wadding
Colored specialties	Jute liner	Groundwood
Blotting	Food boards	Glassine
Catalog	Straw, chip	Greaseproof
Boxboard filler	Toweling, Facial	Butcher wrap

Here is something that rates the consideration of every Superintendent, particularly those who would like to get clear away from flat screens. Write Shartle.

SHARTLE BROS. MACHINE CO., Middletown, Ohio
DILTS MACHINE WORKS, Fulton, New York

Divisions of THE BLACK-CLAWSON COMPANY, Hamilton, Ohio
Western Sales Office: Mayer Bldg., Portland, Oregon
Associate: ALEXANDER FLECK LIMITED, Ottawa, Canada
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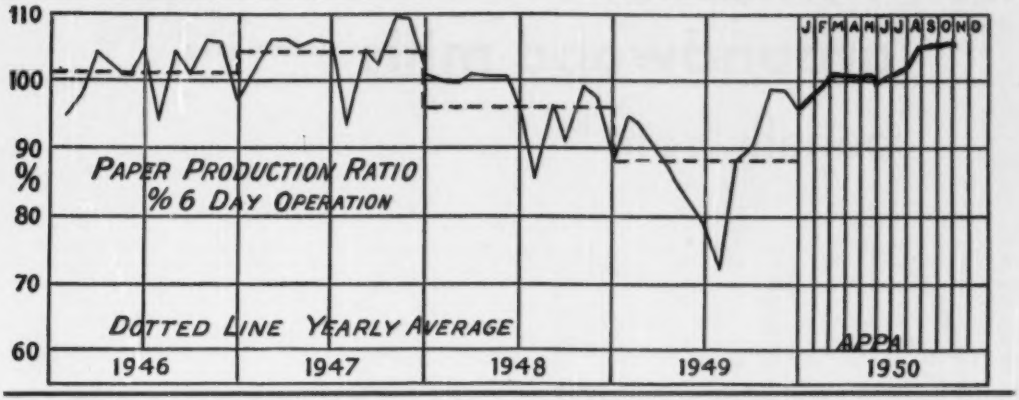
OUR BUSINESS

Weekly Brief of Important Figures



Source	Production	WEEK ENDING Nov. 11, '50	Oct. 14, '50	Nov. 12, '49
APPA	Paper Production percent 6-day Capacity	107.6	107.5	99.3
	Unbl. Kraft Paper Production percent	106.1	97.4	88.6
NPA	Paperboard Operating Ratio percent inch hours	101.0	102.0	94.0
		Sept. 1950	**August 1950**	**Sept. 1949**
APPA	Paper Production* (Except Newsprint and Building Papers) ....Tons	766,000	833,805	699,796
	New Orders ....Tons	820,000	972,914	764,640
	Unfilled Orders ....Tons	932,000	886,969	463,553
	Shipments ....Tons	772,000	842,338	706,642
		Oct. 1950	**Sept. 1950**	**Oct. 1949**
NPA	Paperboard Production ....Tons	944,672	877,945	765,612
	New Orders ....Tons	931,828	872,012	803,535
	Unfilled Orders ....Tons	694,741	714,877	497,820
	Our Customers Activities Index[1]	**Latest Mo.°**	**Previous Mo.°**	**Year Ago°**
FRS	Manufactures Total Index	220	207	181
	Durable Mfg. Index	248	237	194
	Nondurable Mfg. Index	197	182	170
	Chemical Products Index	266	257	226
	Mfg. Food Products Index	188	177	189
	Printing and Publishing Index	161	150	143
ODC	Magazine Advg.-Printer's Ink Index	316	321	284
	Retail Sales Combined Adjusted Index	345.8	354.0	300.5
	Drug Index	225.9	221.2	223.9
	General Merchandise Group Index	347.3	369.2	294.5
	Grocery and Combination Index	404.2	410.9	360.8
	Prices Index			
BLS	Consumers Price Index[1]	173.0	172.5	168.6
	Wholesale all Commodities[2]	166.3	162.9	152.9
	Wholesale Foods[2]	174.6	171.4	160.6
	Commodities other than Farm Products and Foods[2]	155.3	151.5	145.0
	Wholesale Pulp and Paper[2]	163.9	159.9	156.8
	Purchasing Power of Dollar, Consumers Prices[1]	57.8	58.0	59.2
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	367.2	361.9	323.0
	Unemployment Compensation Initial Claims (M)	641	971	1,252
	Miscellaneous Carloadings–Thousands of Cars	1,574	1,433	1,365
	Electric Output (Million KW hr.)	33,874	31,626	29,551
PTJ	Average 32 P & P Common Stocks as of Nov. 14	$33.96	$34.25	$29.20
	Average Indicated Dividends Common Stocks as of Nov. 14	$ 2.53	$ 2.43	$ 2.31

[1] 1935–39=100 Unadjusted Index
[2] 1926=100
* For details see APPA Monthly Statistical Summary—September 1950 Estimated Figures
° Latest Month Available on Request

Here's how

groundwood mills

benefit from

Calgon*

and **calgon**

technical

service

1.

PITCH CONTROL

Pitch is especially troublesome when green wood is used in pulping, but even when seasoned wood is used, pitch may also be a problem. It accumulates on wires and press rolls, causes wet breaks and decreases production. Controlling pitch agglomeration by the use of Calgon prevents this—and Calgon technical representatives will be glad to show you how Calgon can be used to best advantage in *your* mill.

2.

IRON CONTROL

Iron, even in concentrations of only 1 or 2 parts per million has a decided effect in breaking down peroxide.

Copper and manganese likewise act as catalysts.

Calgon has the ability to inhibit the action of iron, copper, and manganese, and this same treatment will also eliminate staining due to iron.

Calgon technical representatives are ready to help you get best results.

We will be glad to give you full information on these and other uses of Calgon in the paper industry. Just write and tell us about your problem.

*T. M. Reg. U. S. Pat. Off.

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PITTSBURGH 30, PA.

Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, November 22, 1950.

Market Pulps

Unbleached Kraft Pulps.—Spurred by phenomenal demand and short supply, prices of unbleached kraft pulps took new lifts.

Where contract clauses permit, Canadian grades were advanced November 1 from $110 to $120/125, varying by mill. Southern (U.S.) unbleached krafts, which respond to spot market conditions in price and supply, are quoted at $125 to $160, by grade.

Pulp Production and Inventory.—Reaction of Finnish losses on market pulp inventories will be made evident when official October figures are released. Unofficial data show cuts in Finnish unbleached krafts alone—due to strike losses—at 75 percent during October compared against the nine months average of 10,620 tons.

Overall drop in market pulp inventories at paper and board mills during September totaled about 15,000 tons; bleached sulfite dropped 1,900; unbleached sulfite, 5,000; unbleached kraft, 7,600 tons. Stocks at pulp mills for later sale on September 30 were 29.6 percent less. Sulfites dipped 5,000 tons, krafts took a slight gain, "all others" (defibrated, exploded, screenings, asplund, damaged, semichemical and chem. fiber, etc.) dropped 2,000 tons.

Pulp Production

Pulp production for September was reported at 92.0 percent of base capacity, by the Bureau of the Census, with sulfite rated at 87.6 and sulfate at 96.0.

Disparity between these figures and those of the industry are notable. Percentage figures of the U.S. Pulp Producers Assn. for the same month are quoted at 96.0 for sulfites, 99.0 for sulfates. The USPPA figures are based on normal rated capacity reported by each mill week by week. Production base for the Census report is a "calculated figure, based on the highest average daily production of each mill in any three months of Census record, multiplied by the number of working days in the month covered by the report."

Paper and Paperboard Production

A similar disproportion is present between industry and Census figures on paper and board production, and for the same reason. Industry production ratio reports for September rates paper production at 101.7 percent of capacity, and board at 96.0. Census figures place paper at 91.1, board production at 87.6. Method of figuring the production is accountable for the differences. APPA figures are normal rated mill capacity; BOC base is formula-established.

WOODPULP: U. S. PRODUCTION, CONSUMPTION, INVENTORIES, SEPTEMBER, 1950
(Tons of 2,000 pounds)

Grade	U. S. Production		Consumption in paper & bd. manuf.	End of Month Inventories		
	Tons	% of Base		At pulp mills, for later sale	At paper & bd. mills	
					Sept.	Aug.*
Total	1,247,156	92.0	1,397,584	16,995	408,762	423,742
Sulfite, Total	233,851	87.6	279,911	10,602	185,736	192,626
Blchd., Total			174,166	8,874	88,983	90,839
Dissolving			3,336	1,728	9,271	10,296
Softwood			159,689		74,891	76,620
Hardwood			11,141		4,821	3,923
Unblchd.			105,745		96,753	101,787
Sulfate, Total	621,341	96.0	695,698	3,422	169,195	176,801
Blchd. Total			144,405		82,978	82,604
Semi-blchd.			31,984		4,600	4,994
Unblchd.			519,309		81,617	89,203
Soda	44,533	91.0	48,480	244	13,989	13,952
Groundwood	196,637	86.5	221,472	114	34,882	34,480
All Others	150,794	91.7	152,023	2,613	n.a.	n.a.

Based on Bureau of Census figures. n.a.—not available. * Revised.

Market students are watching the "new orders" section of weekly paperboard reports for signs of a sag in demand, as reported on this page regularly. Special note is being taken of the drop to 199,278 tons during the week ended November 11 from the peak of 321,394 in the earlier week.

In trade opinion, this drop does not point up a change in trend. Analysis is that the month's first week is normally heavy, and that the November 4 peak may involve some rush holiday orders. Also implicated is mill unwillingness to accept more than emergency orders. Within the industry there is voiced a hope that the feverish demand may soon break. It has not done so yet. Production ratio is rated at 101 percent.

Paperboard grades took the rumored price rise this week. Advances of $5.00/7.50/10.00 are reported on *Prices* page. They vary by mill and by grade.

Waste Paper Market

More tonnages of all grades of waste papers are wanted for immediate needs and to rebuild mill inventories against winter months and short collections.

During the week, prices on the New York market were quotably unchanged for contract lots. Mill pressure for wanted quantities is declared by dealers to be responsible for higher prices. On such a cooperative market, the mere report that a higher price has been named will set a new peak, if repeated a few times, whether for pulps, cottons or waste papers. The mills do themselves a disservice, it is said, when they get out of line.

Chicago reports a new rise of $2 for *news*. Other grades are unchanged.

The Boston area is strengthened by the return of Bird Company mills to the market after a 12-week strike. The men returned to work on November 17. New ranges were set for most grades of waste papers and the market undertone has taken on new snap.

Materials

Aluminum, Sulfate.—Price responds to market conditions of supply and demand and higher operating costs; rise of 50 cents a hundred becomes immediately effective. Quoted at $3.25, carlots, works.

Casein.—Renewal of domestic and foreign buying firms undertone of Argentine market. Indications are that this is the sole world source of volume supply and that this is well sold. Price advanced to 36½/36¾/37c.

Rosin.—U. S. Govt. charges of price-fixing on the Savannah naval stores exchange are held unwarranted. Upswing in rosin prices is seen as the direct result of CCC lifts in selling prices of surplus holdings and to the heavy demands for rearmament program.

A blanket denial to charges of violation of Federal anti-trust laws was filed by the Savannah Exchange and its affiliates, November 15. Defended by the exchange were the "weighted average method of computing prices." Denied were "arbitrary action of the quotations committee" and allegation that Columbia Naval Stores Co. and turpentine and rosin factors would make small offerings in order to regulate prices. Sales between affiliates are allowed, the Exchange said, but these do not affect the competitive market reflected by the Exchange. Offerings of rosin and turpentine made by Columbia are a contribution to having a competitive basic market on which the industry can base its purchase and sale, not to control prices, the answer said.

Unchecked is a rumor that CCC will make no offerings of rosin for the month of December, maybe longer.

Sulfur Dioxide.—Price lift of $5 a ton announced by one plant for January 1 is partially due to recent sulfur advances.

Sulfuric Acid.—Supply extremely tight with worsening conditions likely.

Sulfur.—Alarming situation created by growth in domestic consumption and heavy exports to Marshall Plan countries. Some cutback considered likely through export quotas. Two largest producers already have stopped exporting except where already committed. One of these has announced a 20 percent cut in consumer allotments for the balance of 1950.

Paperboard Production (Tons)*

	Nov. 11 1950	Nov. 4 1950	Nov. 12 1949
Production	233,487	236,142	207,837
New Orders	199,278	321,394	182,831
Unfilled Orders	739,323	774,891	444,302

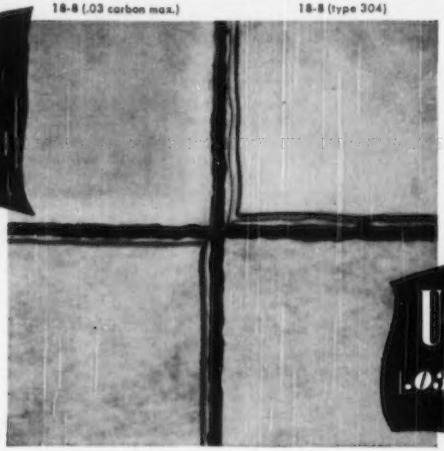
Source: NPA.

Two new extra-low carbon

U·S·S Stainless Steels

give high corrosion resistance after welding

U·S·S 18-8
.03 carbon max.



U·S·S 18-8Mo
.03 carbon max.

This panel, composed of specimens of the four grades indicated, illustrates dramatically how low carbon grades resist corrosion after welding. The panel was exposed for 6 hours to a 10% HNO_3, 3% HF solution at 80°C. Neither of the low carbon specimens shows evidence of deterioration, while the standard 18-8 (type 304) grade is completely severed at the critical weld zone and the standard 18-8Mo (type 316) specimen is severely attacked at this point.

If you need a grade of Stainless Steel that must undergo exposure to exceptionally severe corrosive conditions after welding or hot forming, you'll find real savings in these two new grades of U·S·S Stainless Steel which contain a maximum of 0.03% carbon.

During exposure to sensitizing temperatures—800° to 1600°F.—some of the chromium in ordinary grades of Stainless combines with carbon to form chromium carbides, thus reducing corrosion resistance. Heretofore, fabricators have had to combat this by annealing the product or by the use of steel containing such stabilizing elements as columbium or titanium—both expensive operations.

Development of two new U·S·S Stainless Steels—U·S·S 18-8 [.03 carbon max.] and U·S·S 18-8 Mo [.03 carbon max.]—now makes the inconvenience of special treatment or the extra cost of stabilized grades in many applications unnecessary. In these new grades, the carbon content has been drastically reduced, practically eliminating the problem of carbide precipitation with resultant intergranular corrosion.

Corrosion tests of welded joints have indicated that these new grades give resistance to intergranular corrosion adjacent to welds equal to the more expensive stabilized grades and far in excess of ordinary grades.

By replacing stabilized grades with low carbon grades, you can realize savings in material costs up to 10%. In many cases, stress-relieving of welded vessels can be accomplished at substantially lower temperatures.

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UNITED STATES STEEL

News of the Week

Paper TRADE JOURNAL

Theo. A. Cook, resident manager of the Charleston, S. C., plant of the West Virginia pulp and Paper Company for the past 14 years, will retire from active duties with the organization, which he has served since 1910, on December 1, 1950.

HOWARD SMITH BOND ISSUE

OTTAWA — Howard Smith Paper Mills will shortly issue almost $12 million of first mortgage bonds for refunding and for capital expenditures, it is understood. The new bonds will consist of $5,995,000 two 3 per cent serial bonds due December 1, 1952-60 and $6 million 3 percent due 1961-70. Proceeds of the new issue will go partly for refunding and partly for capital expenditures, including part of the 1950 expansion program, providing at the same time some of the money for the company expansion program over the next three years which is likely to total $13,550,000 for the company and its subsidiaries.

The expansion program includes such major additions as installation of a new paper machine at Cornwall, Ont., for the manufacture of bond, book ledger and similar fine papers as well as a small increase in the plant's soda pulp capacity. In addition, another machine is planned at Alliance Paper Mills at Merritton for manufacturing grease-proof papers, glassine, etc.

HUDSON AWARDS CONTRACT

PITTSBURGH, Pa.—The Hudson Pulp & Paper Co. has awarded a contract to the Power Piping Division of Blaw-Knox Co. for the piping requirements of an expansion project at its Palatka, Fla., plant.

The new power plant consists of a power boiler, a recovery boiler and a 10,000 kva turbine operated at 425 pounds pressure and 750 degrees Fahrenheit. The amount of the Blaw-Knox contract is approximately $600,000.

RAYONIER REORGANIZATION

In a reorganization of Rayonier Inc. recently concluded, Charles R. Blyth, president of Blyth & Co., San Francisco and New York, was elected chairman of the board of directors. W. G. Reed, president of Simpson Logging Co., Seattle, Wash., was elected chairman of the executive committee and executive vice-president.

Pending the selection of a president, Mr. Reed will be the chief operating executive and will establish his office in New York in order to devote his entire time to the affairs of Rayonier Inc.

Donald S. Leslie, executive vice-president of Hammermill Paper Co., and J. D. Zellerbach, president of Crown Zellerbach Corp., were elected to fill the two vacancies on the board.

The reorganization resulted from the resignations of Edward Bartsch and W. S. Lucey as officers and directors of Rayonier, effective November 14.

Mr. Blyth and Mr. Zellerbach were two of the leading founders of Rayonier and its predecessor companies. Mr. Blyth has been a director of the company continuously since that time as has Mr. Zellerbach except for a three-year period. Hammermill Paper Co. and Simpson Logging Co., represented by Mr. Leslie and Mr. Reed respectively, have held stock in Rayonier since the founding of the company and today are the two largest stockholders.

ELK FALLS BOND OFFER

OTTAWA—Announcement is made of an offering of $3 million Elk Falls Co., Ltd., general mortgage bonds, 5 percent series A, by Wood, Gundy & Co., Ltd. This offering is being made concurrently with the sale largely to investing institutions of $10,500,000 first mortgage bonds series A of the same company due December 15, 1954-61 and 1970.

Proceeds of the sale of these two issues will be used to provide funds required to meet in part the cost of erecting the company's new mill at Duncan Bay, B. C., which will have an estimated initial capacity of 74,400 tons of newsprint per annum.

This company was formed in September by Canadian Western Lumber Ltd. and Pacific Mills Ltd., each of which own 50 percent of the outstanding voting shares of Elk Falls Co. which companies have entered into an agreement to purchase additional Class B common shares to supply further capital to complete the plant if required. It is estimated that operation of the new mill will commence before December 31, 1952.

The general mortgage bonds are being offered at 100 and interest to yield 5 percent and it is expected that bonds in interim form will be available for delivery on or before December 15.

KALAMAZOO FILTRATION PLANT

Kalamazoo Paper Co. of Kalamazoo, Mich., have contracted with Hungerford & Terry, Inc., for a 16 million G.D. water filtration plant for decolorizing and otherwise clarifying the local river water supply. The order involves the furnishing of nearly twenty-five carloads of water treating equipment and material including pumping units, traveling screen, two 73′ square x 20′ high upflow, slurry zone type coagulator units, automatic chemical feed machines and nine 450 square foot Air-Water-Wash type mechanical sand clarifying filters.

COLUMBIA START-UP PLANS

Operations of the $35 million sulphate mill of the Columbia Cellulose Co. at Watson Island, near Prince Rupert, B.C., are expected to get under way during February, 1951.

George Schneider, New York, vice-president of the Celanese Corp. of America, parent company, during a recent visit to Prince Rupert, stated the plant would be ready for production around the end of January.

Logs floated down the Skeena River are already on the ground and logging is proceeding in the Kitsumkalum Valley, near Terrace, B. C., and at Khutzamateen Inlet, near the mouth of the Naas River.

Employment will be given 700 to 1000 men in mill and woods — about 500 in the mill.

ST. RAYMOND CHANGE

OTTAWA — All shares and undertakings of the St. Raymond Paper Co., which operates a newsprint mill of 50 tons daily capacity at St. Raymond, Que., and an unbleached sulphite mill of 100-ton daily capacity at Desbiens, Que., have been acquired by St. Raymond Properties Ltd., a new company recently incorporated for that purpose.

No public financing in connection with the change of ownership is contemplated at the present time. Jean Blais is president of the new company and Richard O. Johnson is vice-president.

Shortages?

We are hearing on every side talk of scare buying, shortages, quotas, restrictions and all manner of controls. Is it fear, just talk or real? We have been checking up to get basic information if possible. The National Conference Business Paper Editors recently made a comprehensive survey. With few exceptions the results indicate there will be sufficient for all if we keep our shirts on. Of course, temporary shortages can and will occur over short periods because of heavy Federal buying and stock piling. In order to check again we sent out a questionnaire to a representative group of suppliers to get their opinions.

We asked them if 5 – 10 – 20 percent diversion for defense would seriously handicap their shipment to our industry. Whether trouble would most likely come from shortage of material, manpower or shipping. Their comments are:

Copper and alloy sheet, rod, wire mfg.

RESPONSE: 1. Raw material shortage has already reduced our shipments to all customers. Defense orders are expected to increase materially.

2. If 5 percent, no; material drain is more than 5 percent now. Probably closer to 15 percent. Drain is unbalanced.

Electrical Equipment

RESPONSE: 1. Five percent, no; 10 percent, some effect; 20 percent, definitely — caused by material shortage.

Paper Machinery

RESPONSE: 1. Five percent, no; 10 percent, yes; 20 percent, yes. Shortage of materials and manpower most likely to cause trouble.

2. Up to 20 percent cut will not greatly effect shipments. Greatest difficulty will be from red tape and concentrated government buying over short periods.

Clay

RESPONSE: 1. Five – 10 percent, no effect; 20 percent, yes. Trouble will come: 1. Manpower; 2. Shipping; 3. Materials.

Packing, Insulation, Roofing, etc.

RESPONSE: 1. Five percent, no; 10 percent, slightly; 20 percent, serious effect. Primarily due to present mothball fleets, and other standby facilities, we are in good shape.

Chemicals

RESPONSE: 1. Five percent, no effect; 20 percent, yes; with allocation coming sometime between.

Dyestuff and Organic Chemicals

RESPONSE: 1. Five percent, no (but continual hoarding of raw materials will upset production); 10 percent, material effect; 20 percent, seriously handicap manufacture.

2. Five percent, no; 10 percent, slight; 20 percent, seriously.

Starch, Glue, etc.

RESPONSE: 1. Little likelyhood of trouble.

2. To the extent withdrawn, it will affect all customers, running at full capacity for past several years.

Waxes

RESPONSE: 1. Five percent, no; between 10 – 20 percent, allocation will probably be necessary.

From this cross section it would seem that there is little to worry about unless or until things get materially hotter.

If the experience of England means anything, their all-out effort took about 25 – 30 percent of their overall production and we have a long way to go before we reach that stage.

Thus it would seem that moderate inventories should be the order of the day.

Rubber

Rubber industry should be able to supply all military and essential civilian rubber product needs in the coming year without alarming shortages, if plans are not changed from present National Defense Program.

SWEDEN'S NEWSPRINT PRICE

Price of newsprint for papers in Sweden is fixed by the government at around $80 per ton, according to Nils Ekstrom, mill superintendent of Holmens Bruks Paper Mill Co., one of the largest newspaper producers in Sweden.

Mr. Ekstrom said Swedish companies were actually selling paper on the domestic market at a loss and had to export to make any profit. The domestic price ceiling did not apply to newsprint exports.

NPA EXCLUDES WOOD PULP

Exclusion of wood pulp from the National Production Authority's basic priorities regulation has been announced. As a result, no "DO" priority ratings may be used to obtain wood pulp.

Today's action was taken, NPA said, because only 6 or 7 percent of United States consumption of wood pulp is available for purchase on the domestic market. Consequently, only this small quantity has been subject to "DO" ratings. The exclusion of wood pulp from the priorities regulation is designed to prevent disruption in the production and distribution of the several essential grades of wood pulp, NPA officials pointed out.

U. S. consumption of wood pulp is currently at the rate of about 17 million tons annually.

Most pulp is consumed, according to NPA, by mills that either produce it themselves or import it from abroad. On the other hand, the limited amount of pulp marketed domestically is important to some 400 or more small paper and paperboard mills. Removal of this supply from the "DO" rating system gives these small businesses access to it without seriously interfering with the pulp supply position of the integrated or importing mills.

Letter to Editor

October 27, 1950

Dear Mr. Perry:

In your issue of September 14, 1950, of the *Paper Trade Journal*, I have just been reading a good and interesting article by Mr. F. G. L. Becker, on Fine Paper Production from Bagasse.

This is interesting because it takes me back to early days in my Paper Making, when I gleaned an awful lot of information by just listening to my elders.

Amongst the fibres discussed, and many times it cropped up, was Waste Sugar Cane and Bamboo, all of which came from Sugar Refineries at Greenock to Balerno Bank Mills, Nr. Edinburgh — now the home of John Galloway & Co., Ltd.

This was originally a small one machine mill, 60" wide trimmed, and the number of various fibres used, according to Old Hands, was a revelation.

From about 1885 to 1892 this Sugar Cane and Bamboo was used extensively and the paper was sold as Writings and Printings, in fact it was sold in the Esparto Paper Markets, evidently with success.

Their plant was not anything like the highly developed and scientific fit up of Mr. Becker's Cellulose Development Corporation, nor could it be at that date.

For many years I kept a sheet of this paper, a beautifully made cream laid D. Cap 26, signed by the Machineman just as he had taken it off for weight checking. He was the first machineman I beat for when I became a Beaterman at the age of 16, and from whom I learned a great deal. Years afterwards, I had a young Indian B.Sc. under my care, and after a lot of pleading on his part, I parted with the sheet. It was sent to some of his friends in India along with its history.

If these old lads could make paper from Cane Waste in those days to compete with Esparto, there ought to be little difficulty in doing so today.

May I say it is always very interesting to read the *"Journal."* It seems to bring Paper Makers together somehow in a way that is homely.

It is always refreshing, and we can do with refreshment these days.

Robert McNeill
General Manager
John Wild & Sons, Ltd.
Radcliffe, England

ST. REGIS ADDS MACHINE

WATERTOWN, N. Y.—The receipt of orders for two large paper machines to be delivered during the next year and requiring the employment of an increased working force, was announced by Abe Cooper, president of the Bagley & Sewall Co.

The larger of the two machines, a 228-inch wide Fourdrinier designed to produce kraft paper for multiwall bags, will go to the Pensacola, Fla., two-machine mill of the St. Regis Paper Co., and is to be delivered in ten months.

The other machine is a 226-inch Fourdrinier designed for the production of newsprint paper and is to be delivered to Muztaler Holtoff und Papier Fabriks Akt, at Bruk, Austria. It is to be delivered the latter part of 1951.

PUBLIC RELATIONS AWARD

In Washington, D. C., on November 14 the American Public Relations Assn. presented to Robert Gair Co., Inc., N. Y., a silver anvil trophy, the top award, in the classification Industry (Manufacturing) for the most notable 1949-50 public relations performance. The presentation of the trophy was made to Wilbur F. Howell, secretary and director of public relations of Robert Gair Co., Inc., at a special luncheon in the Congressional Room of the Hotel Willard, Washington, D. C.

WOOD PULP AT ALL TIME HIGH

All time highs in the nation's production and new supply of wood pulp are foreseen by Lawson P. Turcotte, president, Puget Sound Pulp & Timber Co., in his review of the industry's record for the first nine months of 1950. Production, Turcotte states, is running 23 percent ahead of last year, and 13 percent ahead of 1948, the best previous year. New supply, which includes import balance, is exceeding last year's tonnage by 27 percent, and beating the 1948 record by 11 percent.

INCREASED FREIGHT RATES

RICHMOND, Va. — The State Corporation Commission has authorized Virginia rail carriers to increase freight rates on pulpwood by almost 14 percent.

However, the new rates, under the order, cannot be applied until the same rate schedule has been approved for interstate shipments and by other States in which Virginia pulpwood shippers and receivers compete.

Most of the leading pulpwood-using industries have concurred in the new rate schedule which is basically a plan to provide a uniform system of intrastate scales. No opposition to the increases developed at an SCC hearing last week.

The plan will set rates at a level of 50 percent higher than the rates in effect April 14, 1938.

J. J. UPSON, VICE-PRES.

LOCKPORT, N. Y.—THE UPSON CO. has anounced the election of James J. Upson as administrative vice-president. He will continue his present duties as Secretary of the company, manufacturers of laminated fibre wall and ceiling panels.

ECA MILL PROJECT

WASHINGTON — Close to $2 million will be expended under an ECA program on development of a Portuguese pulp and paper mill, it was disclosed by that agency this week.

Commodities and incidental services for the ECA-Cacia mill project were authorized, totaling $1,998,000. Procurement is to be made in this country, with the contract period extending to November 30, 1951.

CANADA TO MAKE SULPHUR

OTTAWA — With costs of such imports from the United States increasing and sulphite mills using extensive quantities in processing of pulp, it is learned that Canadian pulp and paper mills are looking into the prospects of finding elemental sulphur in Canada in order to conserve valuable United States dollars. So far only one company, Noranda Mines, is known definitely to be making progress in developing a process for obtaining elemental sulphur and iron oxide sinter from pyrites, the latter being high in sulphur content.

Canadian pulp and paper firms are also known to be investigating the possibilities of making their own sulphur dioxide from pyrites. However, up to now no specific results of this effort have been made known. No urgency exists at present since supplies are coming from the United States and stocks on hand are said to be plentiful.

INTERNATIONAL WAGE RAISE

NIAGARA FALLS, N. Y.—Employes of the Niagara Falls plant of the International Paper Company have received a five percent wage increase.

The wage hike was the second such boost within five months for the company's employes and raised the basic wage rate at the local and North Tonawanda plants to $1.32.

TANNIN FROM WASTE BARK

Forest Products Laboratories at Vancouver, B. C., have developed two new methods of extracting tannin from useless contaminated wood bark, according to an announcement by Dr. J. A. F. Gardner and Harold MacLean of the Laboratories.

The bark of western hemlock, containing 15 percent good tannin, is badly contaminated by sea water salt when used in the logging industry. Today this bark is useless.

The scientists have proven, however, that even without purification the tannin in this bark may be used in petroleum "drilling muds," which are used to force rock particles to the surface.

Two-thirds of present tannin is extracted from South American quebracho bark, which costs Canada more than $2 million a year. In 1948 the total cut of hemlock bark in British Columbia contained 23,000 tons of tannin, more than three times Canada's annual need.

The second method, that of purifying contaminated tannin for use in the leather industry, has not yet been tested in a pilot plant. Commercial leather experts say, however, that it produces excellent sole leather.

JAPAN SEEKS RAYON PULP

Rayon pulp from British Columbia is sought by two Japanese business men who recently spent some time in B. C. Yutaka Kitagawa, manager, purchasing department, Teikoku Rayon Co., Osaka; and Shunji Matsui, director of Toyo Rayon Co., Tokyo, state they have had no success in buying rayon pulp in other markets, but are hopeful that they can secure a supply in British Columbia. They state that in eastern Canada they found plants were booked up for a year ahead.

Before the war Japan was one of Canada's best customers for rayon pulp, and it is hoped that this business can be redeveloped. The Japanese believe that Finland is at present sending all its pulp to Russia.

$50 TO EACH EMPLOYE

MIDDLETOWN, Ohio — Each of the 2,000 employes on the payroll of The Gardner Board & Carton Co., with plants in Middletown and Lockland, Ohio, was presented with $50 in commemoration of the Gardner organization's 50th anniversary being observed during November.

Edward T. Gardner, co-founder and president of the company which is internationally known in the paperboard and carton industry, reported that $100,000 in cash was involved in the distribution in which every employe was sharing alike.

The Gardner "50th anniversary" gift was being presented to the company's pensioners and to those on leave of absence due to current military service, as well as to the actively present-employed, Mr. Gardner said.

Corrosion—VII of Series

The Use of Nickel Containing Alloys in the Pulp and Paper Industry

H. O. TEEPLE

(Concluded from November 16, 1950, issue)

Papermaking

The use of nickel containing alloys in the paper mill is quite extensive. The primary reason for this is their resistance to corrosion by the various stocks and solutions encountered. In addition to improved service life of the equipment the use of these alloys has permitted the production of a paper of improved quality.

This discussion will more or less follow the line of flow of stock from the digester to the paper machine. Except in a few instances, the type of pulping process used, i.e., alkaline, acid or groundwood will not alter the discussion. Those few exceptions, however, will be noted at the appropriate times.

In addition to paper making, a short discussion on the use of nickel containing alloys in bleaching and paperboard manufacture will be included.

Pulp Washing

In alkaline pulping, the cooked pulp is initially washed free of the spent cooking liquor on vacum type cylinder machines known as brown-stock washers. These machines usually are of steel construction except for the built up decks and facings, which are either of Monel or stainless construction. Either alloy is quite resistant to corrosion by the brown-stock and a good trouble free service life can be expected. That these alloys are suitable is indicated by the data appearing in *Table X*.

TABLE XI

PLANT CORROSION TEST IN SULFITE PULP WASHER HEADBOX

A. Specimens exposed for 82 days in sulfite pulp containing residual cooking liquor, temperature 68° F., pH 5.5.

B. Specimens exposed for 236 days in sulfite stock from the blow pit, temperature 64° F., pH not stated.

C. Specimens exposed for 235 days in sulfite stock from the blow pit, temperature 64° F., pH not stated.

Material	Indicated Corrosion Rates, ipy Test A	Test B	Test C
Type 304 S. S...	0.0001	0.0001	0.0001
Type 316 S. S...	0.0001	0.0001	0.0001
Inconel	0.0001	0.0001	0.0001
Monel	0.0049	0.0001	0.0001
Nickel	0.015(*p*)	0.0002(*p*)	0.0001(*p*)
Cast Iron	0.017	0.003	0.002
Ni-Resist	0.011	0.0008	0.0002

(*p*) Specimens pitted during test.

These data not only indicate that Monel and the austenitic stainless steels are suitable for brown stock washers but they also indicate that Ni-Resist would be a useful material for cast parts of washers and would be preferred over cast iron.

In the case of sulfite pulp washing, the usefulness of the austenitic stainless steels, particularly Type 316, is outstanding and consequently these alloys are used extensively for the initial washing of the sulfite pulp. Monel, nickel and Ni-Resist generally are not suitable for this service.

McGregor (68) described in considerable detail the operations involved in handling sulfite pulp from the digester with particular reference to washing and screening equipment. Mention is made of the use of chromium-nickel (austenitic stainless) steel for several applications.

Corrosion data illustrating the usefulness of the austenitic stainless steels in sulfite pulp washing are shown in *Table XI*.

In groundwood washing, Monel and the austenitic stainless steels are quite useful. Some of the groundwoods are more corrosive than others and in those cases where the resulting pH values are low, the stainless steels are the preferred materials, particularly for fine mesh wires. Some corrosion data are shown in *Table XII* where a low pH value occurred.

TABLE XII

PLANT CORROSION IN GROUNDWOOD WASHING

Specimens exposed for 30 days, temperature 125° F., pH 4.1.

Material	Indicated Corrosion Rate, ipy
Type 304 Stainless Steel..	0.0002
Type 316 Stainless Steel..	0.0001
Monel	0.0041
Inconel	0.0001
Nickel	0.0067
Ni-Resist	0.0070
Cast Iron	0.014
Mild Steel	0.009

It is to be noted that Ni-Resist showed a low rate of attack and was superior to cast iron indicating its usefulness in some instances. The corrosion rate for Monel, while higher than that of the stainless steels, is, however, low enough to permit the use of Monel for many applications where exposure to the corrosive involves only one surface.

A corrosion test was made in a neutral sulfite semi-chemical pulp mill in the filtrate from the brown stock washer. These data are shown in *Table XIII*.

Another neutral sulfite semi-chemical pulpmill using Monel decks on three stock washers encountered relatively high rates of corrosion of Monel facing wires on the Number One washer, the one receiving the pulp from the digesters. The reason for

TABLE X

PLANT CORROSION TESTS IN ALKALINE PULP BROWN STOCK WASHERS

A. Specimens exposed for 32 days in primary washer head box, temperature 190° F. (Sulfate Pulp).

B. Specimens exposed for 32 days in secondary washer head box, temperature 135° F. (Sulfate Pulp).

C. Specimens exposed under false bottom of a sulfate diffuser (now largely replaced by cylinder washers) for 349 days, temperature and pH not stated.

D. Specimens exposed for 158 days in primary washer head box, temperature 180° F. (Soda Pulp).

E. Specimens exposed for 35 days in soda pulp stock to primary washer, temperature 155° F., pH not stated.

Materials	Indicated Corrosion Rates, ipy Test A	Test B	Test C	Test D	Test E
Monel	0.0005	0.0001	0.0005	0.0001	0.0009
Nickel	0.0034	0.0001	0.0007	.....	0.0008
Inconel	0.0001	0.0001	0.0001	.....	0.0001
18-8 S. S.	0.0001	0.0001	0.0001	0.0001	0.0001
Type 316 S. S.	.....	.....	.....	.....	0.0001
Ni-Resist	0.0014	0.0010	0.0014	0.0025	0.0008
Cast Iron	0.004	0.017	0.011	0.025	0.003
Carbon Steel	0.001	0.014	0.0024	.....	.....

TABLE XIII

PLANT CORROSION TEST IN NSSC PULP WASHER FILTRATE

Specimens exposed for 82 days, temperature 110° F., pH 7.2.

Material	Indicated Corrosion Rate, ipy
Monel	0.0003
Inconel	0.0001
Type 304 S. S.	0.0001
Type 321 S. S.	0.0001
Type 347 S. S.	0.0001
Type 316 S. S.	0.0001
Type 317 S. S.	0.0001
Carpenter 20	0.0001
Chemical Lead	0.0046

the high rate of corrosion of Monel is not apparent at the time of writing. The temperature of the stock is 180°F., the pH 8-8.5. It was established this mill is re-circulating a considerable portion of the filtrate. Further studies are currently under way to develop corrosion rates for Monel and for the austenitic stainless steels.

These two instances would seem to indicate that conditions prevailing in different mills vary considerably in corrosiveness.

After the initial pulp washing operations, the pulp can be handled quite satisfactorily with either Monel or the austenitic stainless steels through the various screening, thickening and other operations up to the paper machine. This general comment does not include bleaching which will be discussed separately.

In primary screening or knotter operations, Monel and 18-8 stainless screens are both available with suitably sized perforations.

Corrosion data are given in *Table XIV*.

Flat screens in the past have been bronze or chromium plated bronze but during recent years, the trend has been toward the use of 18-8 stainless steel screens. However, as in the case of the bronze, failures of the stainless occurred rather frequently due to fatigue of the vibrating screens. Lately, Inconel has received considerable attention for use as a material for slotted flat screen plates. Inconel has excellent resistance to corrosion by the stocks and to slot wear. With these important factors in the background, actual plant use of Inconel flat screen plates has shown them to outlast stainless screens several times. Inconel appears to be much more resistant to corrosion fatigue. In one particularly aggressive location 18-8 stainless flat screens lasted a matter of three months before failure occurred due to fatigue cracking. Inconel plates were installed after a period of about 2½ years the screens were still operating satisfactorily with practically no slot wear. Another instance was the use of ¼" Inconel plates slotted 0.008" handling bleached sulfate stock. These screens showed no slot wear and no fatigue cracking after three years service. Bronze plates lasted four to six months, requiring scraping, recutting or reclosing. Chromium plated bronze lasted only one year with failure of the chromium plating.

In deckering operations, the use of the austenitic stainless steels and Monel in decker construction has been particularly beneficial. The data cited in *Tables XV* and *XVI* are indicative of the resistance of these alloys to corrosin by deckered stocks. These alloys are commonly used for Channels, winding wires, backing wires, facing wires and binding wires or straps. Experience has indicated that long trouble-free service life can be obtained when these nickel containing alloys are used.

TABLE XIV

PLANT CORROSION TESTS IN STOCK AT KNOTTER SCREENS

A. Specimens exposed for 59 days in soda screening head box, temperature 70° F., pH 5.3.
B. Specimens exposed for 75 days in sulfite stock head box to knotter screens, temperature 44° F., pH 4.3.
C. Specimens exposed for 83 days in sulfite pre-screen storage, temperature 47° F., pH 5.6.
D. Specimens exposed for 101 days in groundwood filtrate from knotter screens, temperature 100° F., pH 5.4.
E. Specimens exposed for 87 days in groundwood filtrate from knotter screens, temperature 94° F., pH 5.8.

Material	Indicated Corrosion Rates, ipy				
	Test A	Test B	Test C	Test D	Test E
Monel	0.0010	0.0017	0.0019	0.0003	0.0009
Inconel	0.0001	0.0001	0.0001	0.0001	0.0001
Type 304 S. S.	0.0001	0.0001	0.0001	0.0001	0.0001
Type 316 S. S.	0.0001	0.0001	0.0001	.....	0.0001
Ni-Resist	0.002	0.008	0.008	0.011	0.007
Cast Iron	0.003	0.008	0.021	0.018	.....
Carbon Steel	0.003	0.009	.....	.....	0.10

These corrosion data are also applicable to rifflers. However, some corrosion data have been developed at the riffler in several instances, which are given in *Table XV*.

TABLE XV

PLANT CORROSION TESTS AT STOCK RIFFLERS

A. Specimens exposed for 79 days at sulfite riffler, temperature 68° F., pH 6.8.
B. Specimens exposed for 42 days at groundwood riffler, temperature 97° F., pH 6.5.
C. Specimens exposed for 106 days at groundwood riffler head box, temperature 100° F., pH 4.5.
D. Specimens exposed 106 days in sulfite pulp at Jonsson screens, temperature 51° F., pH 4.5-6.0.

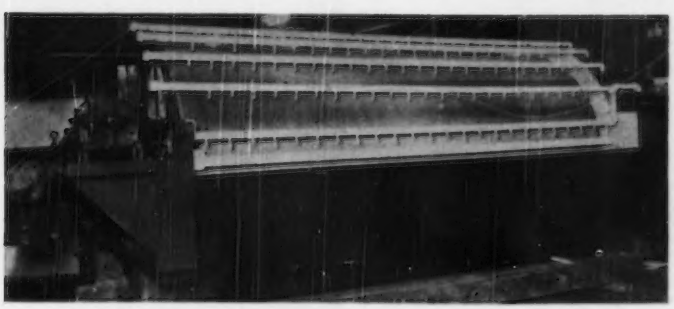
Material	Test A	Test B	Test C	Test D
Monel	0.0001	0.0004	0.0035	0.0025
Nickel	0.0002	0.0006	0.0035(*p*)	0.0040
Inconel	0.0001	0.0001	0.0004(*p*)	0.0002
Type 304	0.0001	0.0001	0.0001	0.0001
Type 316	0.0001	0.0002	0.0001	0.0001
Ni-Resist	0.0017	.....	0.002	0.005
Cast Iron	0.0040	.....	0.009	0.005
Mild Steel	....	0.004(*p*)	0.006	0.006

p Specimens pitted during exposure.

In stock preparation, the use of Monel and the stainless steels in beaters, jordans and disc refiners have proved to be quite meritorious.

Lagerstrom et al (*69*) described the use of Monel jordan bars and presented the economic advantages obtained through the use of Monel for this service.

Beater bars of age hardenable "K" Monel provide maximum resistance to corrosion by the stock as well as outstanding toughness and hardness. These factors are quite important, for example, in broke beaters. Beater bed plates of Monel represent a correspondingly good choice for these rather severe service conditions.

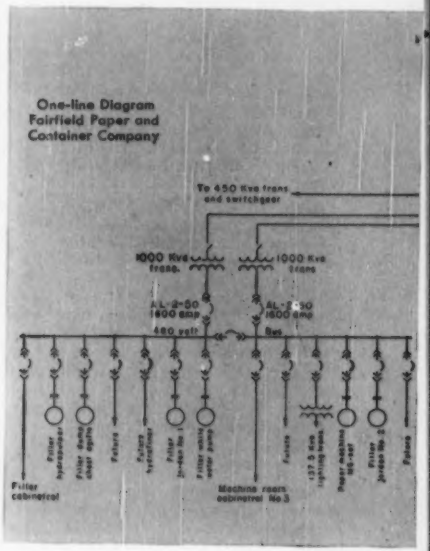


8 x 16 ft. Floor-Mounted Black Liquor Washer. View Showing Drive and Inlet Sides. Monel Face Winding Wire and Fittings.

FAIRFIELD
PAPER AND CONTAINER CO. chooses a

METAL-CLAD
for

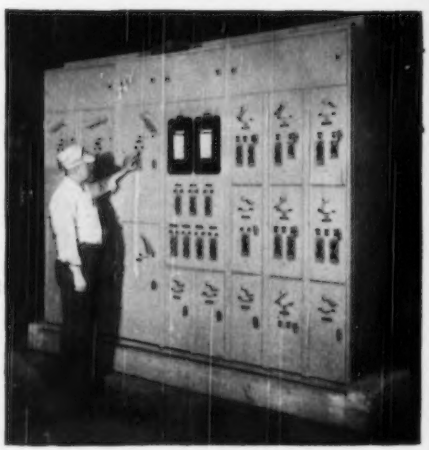
General Electric 5-kv Type MI-6 metal-clad switchgear consisting of one incoming-line breaker and four feeder breakers to handle 4160 volts at Fairfield Paper and Container Co. Magne-blast air circuit breakers are rated 1200 amperes, 100,000 kva interrupting rating. Note neat appearance of metal-clad unit. It's space saving too, and the metal-clad construction offers operating safety to personnel. Units like this are easily installed and can be added to with a minimum of bother and expense. Instruments and relays are co-ordinated for positive protection of circuits.



G-E Cabinetrol units provide centralized control for the liner stock system. Unit controls motors, valves, agitators, etc. Ammeters record load carried by hydrapulper and hydrofiner. Four other Cabinetrol units are used throughout the mill.

The Fairfield installation is a complete General Electric project—one source of responsibility plus the very best in co-ordinated planning, engineering, manufacturing, and servicing facilities to give maximum savings and efficiency to the customer.

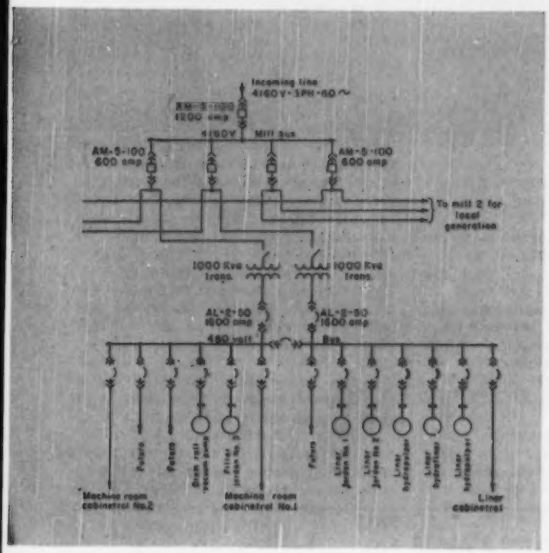
Two G-E low-voltage metal-enclosed switchgear equipments take the 480-volt power from the 1000-kva transformers and distribute it to motors, lighting transformers, and five Cabinetrol units. The Type AL-2 transformer secondary breakers and tie breakers are rated 1600 amperes, 50,000 amperes interrupting rating. Type AK-1 drawout air circuit breakers of 25,000 ampere interrupting rating are used to feed motors and Cabinetrol. Breakers for future circuits can be installed in spare compartments. G-E air circuit breakers have adequate "IC" (Interrupting Capacity) for short circuit protection, are easily removed for inspection.



secondary-selective system using

SWITCHGEAR

continuity of service



At the new Fairfield Paper and Container Co. installation General Electric metal-clad switchgear receives the incoming 4160-volt power and distributes it to 4-1000 kva transformers for step-down to 480 volts. G-E metal-enclosed switchgear handles the 480-volt power through air circuit breakers of the drawout type. In general, all motors rated 60 hp and above are served by an individual breaker. Five Cabinetrol units are fed by air circuit breakers. Note that costly secondary feeders are short.

This secondary-selective system is only slightly higher in cost than a simple radial system, and provides Fairfield insurance against a complete shutdown in case of failure of any one transformer or its primary feeder cable. If trouble occurs the normally-open tie breaker is closed, thus providing an alternate source of power which permits the mill to operate at slightly reduced capacity.

Be sure to see the "More Power to America" full-color sound slidefilm "Modern Industrial Power Distribution." Ask your G-E sales representative to arrange a showing for your organization.

here's why...

"When we planned our new facilities it was decided that a secondary-selective power distribution system would assure us of the continuous power, even in case of a major fault, needed for continuous-process operations like ours. We ordered G-E switchgear because their "metal-clad" protection safeguarded our employees, and because we could get all engineering, equipment and service from one organization. By dealing with one company we saved considerable time and money. The units arrived complete and we installed them in very little time."

H. L. CUSTER, VICE PRESIDENT AND GENERAL MANAGER, THE FAIRFIELD PAPER AND CONTAINER CO., BALTIMORE, OHIO

MODERN INDUSTRIAL power distribution systems using G-E switchgear are applicable to any industrial plant or commercial building where you want proper voltage for top performance of equipment, an extremely flexible setup to take care of expanding or changing loads, adequate short circuit protection, safety to personnel, and low installation and maintenance costs. A complete system, using G-E switchgear, costs you less than a "piece-meal," makeshift affair.

INVESTIGATE TODAY the many advantages of using General Electric switchgear in *your* plant for efficient, flexible power distribution. Contact your G-E sales representative for further information—or write for the helpful bulletins listed below. *Apparatus Department, General Electric Co., Schenectady 5, New York.*

GEA-3083	Metal-clad Switchgear
GEA-4966	Low-voltage Metal-enclosed Switchgear
GEA-3592	Load-center Unit Substations
GEA-3758	Load-center Power Distribution
GEA-4057	Interlocked-armor Cable for Primary Circuits
GEA-4352	Flamenol Cable for Secondary Circuits

GENERAL ELECTRIC

The use of nickel clad steel construction for a hydrapulper is described (*70*). The nickel surfaces protect the paper stock from rust stains and other corrosive effects.

Monel has been used extensively for jordan fillings and its use is particularly warranted today because of the trend toward higher stock consistancies and higher speeds. Monel Jordan fillings are available in hardness ranges from 165 Brinell to over *275*. For regular hydration or brushing services, regular cold rolled Monel bars are adequate. "K" Monel is reserved for those instances where a maximum of cutting action is required. Bronze and martensitic chromium-iron alloys are used for jordan fillings, the latter because of the availability of high hardness developed by suitable heat treatments.

Both Monel and the austenitic stainless steels are quite useful for stock chest fittings, agitators, etc.

To illustrate the useful corrosion resistance of the nickel containing alloys for beater and jordan applications, corrosion test results are presented in *Table XVI*.

TABLE XVI

PLANT CORROSION TESTS IN VARIOUS STOCKS AT BEATERS AND JORDANS

A. Specimens exposed in sulfate stock in beater storage chest for 98 days, temperature 46° F., pH 7.9.

B. Specimens exposed in sulfite stock in beater chest for 84 days, temperature 63° F., pH 4.7.

C. Specimens exposed in sulfite stock in jordan stock chest for 76 days, temperature 84° F., pH 6.0.

Material	Test A	Test B	Test C
Monel	0.0001	0.0009	0.0002
Inconel	0.0001	0.0001	0.0001
18-8 S. S.	0.0001	0.0001	0.0001
Type 316	0.0001	0.0001	0.0001
88-10-2 Bronze	.....	0.0021	.....
Copper	.....	.....	0.0030

In recent years there has been a considerable trend toward the use of Monel, Inconel and stainless steel rotary screens. The useful properties of good resistance to both corrosion and slot wear are largely responsible for the trend. Bronze screens were formerly used in the past but slot wear was quite severe and in an effort to correct this difficulty, chromium plated bronze screens were introduced. This innovation was beneficial but corrosion occurred at the juncture of the bronze and the chromium plate which tended to cause the plate to flake off. Some mills are using the chromium plated bronze screens but increased production rates and more aggressive corrosive conditions caused by higher temperatures and closed circuits have been additional factors in the general preference for the nickel containing alloys.

The usefulness of the nickel containing alloys is indicated by the corrosion data appearing in *Table XVII*.

With reference to Test D—*Table XVII*, Inconel Bird Screens were in use. The mill reported phosphor bronze plates lasted two years and copper one year, both failing due to excessive slot wear. Inconel is reported as giving excellent service. With reference to Test E—*Table XVII*, the mill reported copper screens lasted three months, failures being due to cracking. This mill is now using Inconel and stainless screens with service life reported as "not determined" as the performance is excellent.

TABLE XVII

PLANT CORROSION TESTS IN VARIOUS STOCKS TO ROTARY SCREENS

A. Specimens exposed 59 days to soda stock, temperature 70° F., pH 5.3.

B. Specimens exposed 120 days to sulfite stock, temperature 70° F., pH not stated.

C. Specimens exposed 187 days to sulfite stock, temperature 78° F., pH 5.0.

D. Specimens exposed 77 days to mixture of rag and sulfite stock, temperature 95° F., pH 4.4.

E. Specimens exposed 106 days to groundwood stock, temperature 100° F., pH 4.5-5.0.

F. Specimens exposed 52 days to groundwood stock, temperature 110° F., pH 4.6.

G. Specimens exposed 44 days in newsprint Bird screen headbox, temperature 92° F., pH 4.6.

H. Specimens exposed 160 days in newsprint Bird screen headbox, temperature 90° F., pH 5.

Material	Indicated Corrosion Rates, ipy					
	Test A	Test B	Test C	Test D	Test E	Test F
Monel	0.0010	0.0009	0.0015	0.0021	0.0019	0.0001
Inconel	0.0001	0.0001	0.0001	0.0002	0.0007	0.0001
Type 304 S. S.	0.0001	0.0001	0.0001	.....	0.0001	0.0001
Type 316 S. S.	0.0001	.....	0.0001	.....	0.0001	0.0001
Phosphor Bronze	0.0004*	0.0020	0.0015**	0.0027	.....	0.0010

* 88-10-2 cast bronze.

** Specimens pitted 0.006" during exposure.

In recent years there has been a considerable trend toward the use of Monel, Inconel and stainless steel rotary screens. The useful properties of good resistance to both corrosion and slot wear are largely responsible for the trend. Bronze screens were formerly used in the past but slot wear was quite severe and in an effort to correct this difficulty, chromium plated bronze screens were introduced. This innovation was beneficial but corrosion occurred at the juncture of the bronze and the chromium plate which tended to cause the plate to flake off. Some mills are using the chromium plated bronze screens but increased production rates and more aggressive corrosive conditions caused by higher temperatures and closed circuits have been additional factors in the general preference for the nickel containing alloys.

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The use of nickel containing alloys by the progressive paper mills includes important applications on the paper machine as well as in many instances prior to the machine, as outlined above. Both Monel and the austenitic stainless steels are used extensively for head box linings, mid feathers, slices, aprons, saveall trays and shower pipes and nozzles. Their use for these machines parts has resulted in long trouble-free service performance with the assurance of pulp cleanliness and quality. An interesting description was presented (*71*) concerning the rebuilding of a paper machine to achieve a maximum of corrosion protection. The use of Monel, Ni-Resist and "Z" Nickel for critical parts of the machine are described.

Monel in particular has been used as coverings for breast rolls. Its use for table rolls, wire rolls, suction box covers (although much use is made of end grain maple) is well warranted. Strohecker (*72*) has described the method of manufacture of cover rolls using Monel, nickel and the austenitic stainless steels and mention is made of their applications in paper mills. Considerable use has been made of either Monel or "K" Monel doctor blades. Duranickel, a high nickel alloy hardenable by heat treatment has been used for machine shaker springs and the service performance of this alloy has been outstandingly successful.

Monel dandy roll covers represent a useful application of this alloy with good service life resulting.

To illustrate the resistance of nickel containing alloys to corrosion by paper machine furnishes, results of mill corrosion tests are shown in *Table XVIII*.

TABLE XVIII

PLANT CORROSION IN VARIOUS STOCKS AND WHITE WATERS AT THE MACHINE

A. Specimens exposed to soda pulp white water for 516 days, temperature 70° F., pH 6.4.

B. Specimens exposed in soda pulp chest for 32 days, temperature 60° F., pH not stated.

C. Specimens exposed in sulfate pulp headbox for 43 days, temperature 90° F., pH 6.8.

D. Specimens exposed in bleached kraft savealls for 95 days, temperature 82° F., pH 6.5. Residual SO_2 present.

E. Specimens exposed in wire pit (kraft) for 157 days. Temperature 85° F., pH 4.5.

F. Specimens exposed in wire pit (sulfite) for 184 days, temperature 77° F., pH 3.0-3.3. White water contains residual sulfurous acid and sulfuric acid.

G. Specimens exposed in saveall trays (sulfite) for 84 days, temperature 62° F., pH 4.7.

H. Specimens exposed for 209 days in newsprint white water pit, temperature 95° F., pH not stated.

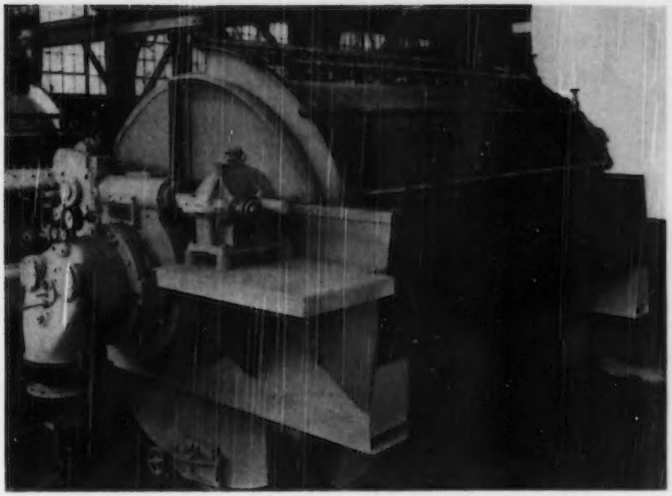
I. Specimens exposed for 159 days in newsprint vacuum seal box, temperature 80° F., pH 4.5-5.5.

J. Specimens exposed for 169 days in newsprint flow box, temperature 97° F., pH 5.2-6.0.

Material	Indicated Corrosion Rate, ipy				
	Test A	Test B	Test C	Test D	Test E
Monel	0.0003	0.0003	0.0002	0.0025	0.0009
Nickel	0.0009	0.0002	0.0001	0.0053	0.0005
Inconel	0.0001	0.0001	0.0001	0.0002	0.0001
18-8 S. S.	0.0001(a)	0.0001	0.0001	0.0001	0.0001
Type 316	.....	0.0001	0.0001	0.0001	0.0001
Ni-Resist	0.003	0.0007	0.012	.....	.....
Cast Iron	0.007	0.0031	0.038	.....	.....

Material	Indicated Corrosion Rate, ipy				
	Test F	Test G	Test H	Test I	Test J
Monel	0.0055	0.0002	0.0002	0.0006	0.0001
Nickel	0.009	0.0007	0.0002	0.0001	0.0001
Inconel	0.0001	0.0001	0.0001	0.0001	0.0001
18-8 S. S.	0.0001	0.0001	0.0001	0.0001	0.0001
Type 316	0.0001	0.0001	0.0001	0.0001	0.0001
Ni-Resist	.....	0.005	.....	.....	.....
Cast Iron	.....	0.007	.....	.....	.....

(a) Specimens pitted 0.011" and also perforated (0.031").



8 ft. Diameter Vacuum Washer—View from Valve End Showing Main Drive Reducer Inlet and Washing Showers. Type 316 Face Winding Wire and Fittings.

TABLE XX

PLANT CORROSION TESTS IN PAPER BOARD LINER STOCK

A. Specimens exposed in mixing box for 140 days in top liner stock consisting of sulfite, soda, and sulfate pulps with envelope cuttings, temperature 90° F., pH 4.3.

B. Specimens exposed between spiders of cylinder mold for 140 days in underliner stock consisting of 50% waste paper and 50% top liner stock as in (A) above. Temperature 90° F., pH 4.3.

Material	Test A	Test B
Monel	0.0030	0.0002
Type 304 S. S.	0.0001	0.0001
Type 316 S. S.	0.0001	0.0001
Ni-Resist	0.023	0.008
Cast Iron	0.023	0.017

Bleaching

The corrosion problems occurring in the bleach plant are not only very important but they are also rather difficult to solve because of the limited number of metals or alloys possessing useful resistance to attack by these aggressive environments. Whitney (28) outlined several problems brought to his attention during his survey of corrosion problems in the pulp and paper industry.

Chlorine or chlorine compounds are almost universally used in the bleaching of paper stocks, such as soda, sul-

Paper Board

In making paper board, the use of nickel containing alloys has been quite extensive during the past several years. These alloys have proven to be quite economical due to the long service life obtained from pieces of equipment utilizing materials such as Monel and the austenitic stainless steels.

A considerable portion of paperboard is made from waste paper for a filler and from high quality broke or pulp for liners. The use of Monel and stainless steels in waste paper beaters or broke beaters results in good service life of these machines.

Cylinder molds and vats of either Monel or stainless construction are frequently used and these alloys are also quite useful for the wet ends of the board machines much as they are for paper machines.

To indicate the resistance of these nickel containing alloys to corrosion by stocks encountered in paper board mills the results of plant corrosion tests are given in *Tables XIX* and *XX*.

TABLE XIX

PLANT CORROSION TESTS IN PAPER BOARD FILLER STOCK

A. Specimens exposed for 180 days on baffle in cylinder mold baffle, temperature 115° F., pH not stated.

B. Specimens exposed for 89 days in waste paper stock mixing box to cylinder mold, temperature 120° F.

C. Specimens exposed for 32 days in filler stock head box, temperature 90° F., pH 7.2.

D. Specimens exposed for 32 days in filler stock thickener inlet, temperature 120° F., pH 8.0.

E. Specimens exposed for 140 days in filler stock mixing box, tmperature 90° F., pH 4.3.

F. Specimens exposed for 194 days in corrugated board filler, temperature 100° F., pH 7.1.

Material	Test A	Test B	Test C	Test D	Test E	Test F
Monel	0.0004	0.0004	0.0001	0.0013	0.0001	0.0024
Type 304 S. S.	0.0001(p)	0.0001	0.0001	0.0001	0.0001	0.0006
Type 316 S. S.	0.0001	0.0001	0.0001	0.0001	0.0001	.....
Ni-Resist	.....	.....	0.002	0.014	0.003	0.008
Cast Iron	0.008	.....	0.008	0.037	0.005	0.020
Mild Steel	0.010	0.016	.....	.....	.....	0.026

(p) Pitting observed on specimens 0.011" in 180 days.

TABLE XXI

PLANT CORROSION TESTS IN HYPOCHLORITE BLEACH SOLUTION

A. Specimens exposed for 65 days in calcium hypochlorite feed tank, temperature 75° F.

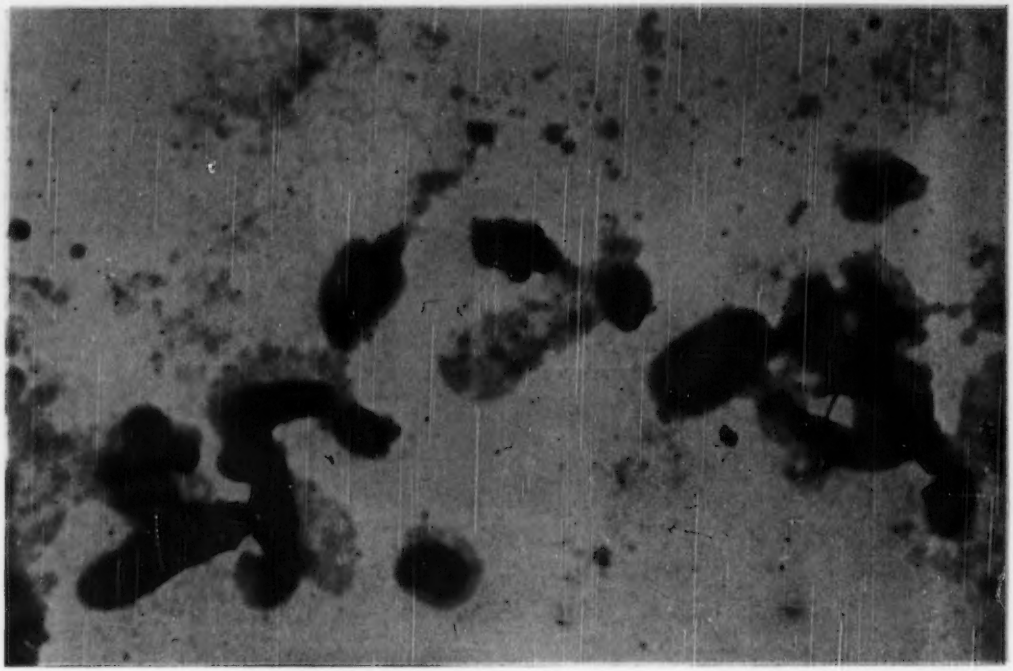
B. Specimens exposed for 30 days in calcium hypochlorite and lime sludge with 40 gpl available chlorine content, temperature 80° F.

C. Specimens exposed for 72 days in calcium hypochlorite bleach liquor containing 0.009 gpl Cl_2, temperature 72° F., pH 6.0.

D. Specimens exposed for 42 days in bleach liquor headbox, 28.5 gpl free chlorine, temperature 81° F.

	Indicated Corrosion Rates (ipy) and Pitting Attack											
	Test A			Test B			Test C			Test D		
Material	Corr. Rate	Pitting Surface	Pitting Crevice	Corr. Rate	Pitting Surface	Pitting Crevice	Corr. Rate	Pitting Surface	Pitting Crevice	Corr. Rate	Pitting Surface	Pitting Crevice
Monel	0.061	Perf.*	Perf.	0.074	Perf.	Perf.	0.0001	0.004	0.003	0.088(a)	.....	.....
Nickel	.....	.....	.....	0.155	Perf.	Perf.	0.0001	0	0.003	0.13(b)	.....	.....
Inconel	.....	.....	.....	0.047	Perf.	Perf.	0.0001	0	0.003	0.13(b)	.....	.....
Type 304 Stainless Steel	.....	.....	.....	0.017	Perf.	Perf.	0.0001	0.009	0.003	0.015	Perf.	Perf.
Type 316 Stainless Steel	0.012	Perf.	Perf.	0.004	Perf.	Perf.	0.0001	0	0.020	0.038	Perf.	Perf.
Hastelloy C	0.0001	0	0	0.0001	0	0	0.0001	0	0	.....	.....	.....
Worthite	0.014	0.13	0.19	.....	0	.....	.....	.....	.....	.....	.....	.....
Durimet 20	0.022	Perf.	0.09	.....	0	.....	.....	.....	.....	.....	.....	.....
Type 317 Stainless Steel	0.003	0.10	0.10	.....	0	.....	.....	.....	.....	.....	.....	.....
Chemical Lead	.....	.....	.....	.....	0	.....	.....	.....	.....	0.003	0.010	0.008

* Perforated.



Bacteria Extracted from Soluble Oils Magnified 29,200X by Electron Microscope.

Deal a Blow to Bacteria!

In most any stage of production, from the raw wood to the finished product, paper and paper products are subject to attacks from bacteria and mold. These micro-organisms growing in lap stock cause discoloration and eventual loss of pulp. And through many stages of production, even to the use of adhesives in assembly, mold and bacteria are an ever-present threat.

Like many leading paper mills you can take precautions to prevent such onslaughts by providing proper microbial and mold control. Dowicides, Dow's industrial germicides and fungicides, will bring protection against these profit eaters. They will help eliminate souring and spoilage.

Deal a blow to bacteria and mold today! Investigate Dowicides. Dow maintains extensive laboratory facilities to help you solve your problems. Contact your nearest sales office or write direct.

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fate, sulfite or neutral sulfite semi-chemical. In recent years, sodium and hydrogen peroxides have come into widely read use for bleaching groundwood and a description (73) of the operation is given. Ullman (74) has described the use of sodium peroxide for groundwood bleaching and a flow sheet of the process is given. It is interesting to note in this discussion the use of an "iron mixing screw" is mentioned and later in the process it became necessary to acidify the stock to remove the yellow tint which forms when the stock comes in contact with the screw mixer. Obviously this situation could have been eliminated by the use of a suitably corrosion resistant alloy for the mixing screw.

Zinc hydrosulfite has been used for the bleaching of groundwood and this process has been described by Andrews (75). It is reported that cast iron stands up reasonably well, the 18-8 stainless steels do not but Type 316 stainless seems unaffected as would be expected. Monel, however, has considerable usefulness in the zinc hydrosulfite bleaching system as will be seen by data to be shown presently. Ferguson (76) described recent advances in groundwood bleaching by zinc hydrosulfite. The zinc hydrosulfite solution is described as being made in a stainless steel (hopefully Type 16) reaction tank. It is reported that Type 316 stainless steel is used in the handling of the stock.

Kingsbury et al (77) described the bleaching of groundwoods with hypochlorites and compared the results with those obtained using sodium peroxide.

Russell (78) described various pulp bleaching processes including the use of chlorine, hypochlories, sodium peroxide and zinc hydrosulfite. In a brief discussion of materials of construction, Type 316 stainless is mentioned as well as "stainless steel."

A round table discussion on pulp bleaching has been summarized (79).

Rue and Nagel (80) discussed the bleaching of gumwood sulfate pulp using hypochlorites and described single and multi-stage processes.

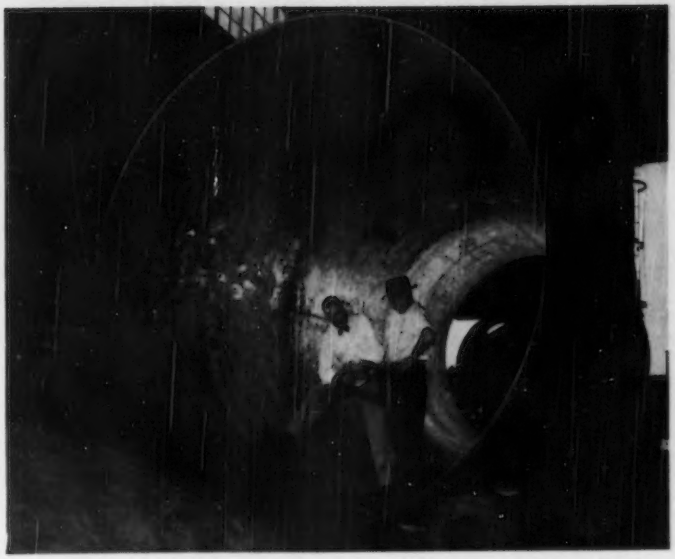
In using chlorine or chlorine compounds for pulp bleaching, generally a multi-stage process is used. As it is generally known, this consists of a direct chlorination for the first followed by alternate caustic extraction and hypochlorite bleach stages. The number of stages are determined by the extent of bleaching desired.

In general, nickel-containing alloys vary in usefulness in handling wet chlorine or hychlorites, either calcium or sodium. The best or most versatile of the alloys containing nickel is Hastelloy C or its equivalent. The nickel base alloy is quite resistant to weight loss attack as well as to local attack, such as pitting. While this alloy is rather high in first cost, its usefulness easily justifies the expense for many bleaching operations. Other nickel base alloys, such as Monel and Inconel and for that matter, commercially pure nickel are useful only for intermittent contact to dilute solutions. Of these three materials, Monel is the most useful in paper stock bleaching. The austenitic stainless steels are generally not suitable for use in contact with wet clorine or hypochlorites except for intermittent use in extremely dilute solutions. They are subject to severe localized attack. However, Type 316 stainless with its somewhat increased resistance to pitting over the 18-8 steels does find extensive use in paper stock bleaching. Plant corrosion data pertaining to pulp bleaching will be shown presently but to illustrate the superior resistance of Hastelloy C to corrosion by strong hypochlorite solutions, data are presented in *Table XXI*. It should be noted that Hicks (34) has mentioned the use of Hastelloy C for rotameters handling chlorine and hypochlorite solutions used for bleaching operations.

In pulp bleaching, where direct chlorination is used for the first stage, experience has indicated that Type 316 stainless steel is fairly suitable for covers on the first stage washers. This alloy appears to be somewhat better than Monel for this service. This is illustrated by the data appearing in *Table XXII*.

However, it should be noted Monel as well as the austenitic stainless steels are suitable for use as covers on the caustic extraction washers. Further, these alloys are generally suitable for covers on the hypochlorite stage washers.

In *Tables XXIII, XXIV* and *XXV* there are presented the results of additional plant corrosion tests in pulp bleaching processes.



Shell of inconel-clad steel sulfate digester built for Crossett Paper Mills, Crossett, Ark. by Wyatt Metal and Boiler Works of Houston, Texas.

TABLE XXII

Specimens exposed 72 days in filtrate sump after vacuum washer after direct chlorination stage of soda pulp bleaching. Temperature 82° F., pH 3.5, 0.011 gpl residual chlorine.

Material	Ind. Corr. Rate, ipy	Max. Pitting Surface	Max. Pitting Crevice
Monel	0.0014	0	.003
Nickel	0.0018	0.018	0.005
Inconel	0.0001	0	0.003
Type 304 S. S.	0.0001	0.003	0.003
Type 316 S. S.	0.0001	0	0
Hastelloy C	0.0001	0	0
Ni-Resist	0.007	....	....
Cast Iron	0.016	....	....

TABLE XXIII

Specimens exposed for 73 days attached to agitator arm in reaction tower immediately following the chlorine inlet valve. Agitation 6 ft. per sec. Temperature 63° F., sulfate pulp, 3.5% consistency, 0.25% free chlorine.

Material	Ind. Corr. Rate, ipy	Pitting Surface	Pitting Crevice
Monel	0.0007	0	0
Nickel	0.0005	.003	.006
Inconel	0.0002	....	.004
Type 316 S. S.	0.0001	.012	0
Type 317 S. S.	0.0001	0	0
Carpenter 20	0.0001	0	0

TABLE XXIV

Specimens exposed 31 days in horizontal Bellmar bleach beater used in bleaching of sulfate pulp. Sodium chlorite, calcium hypochlorite and direct chlorination used separately. Sulfuric acid used to adjust pH 4.5. Temperature 95° F.

Material	Ind. Corr. Rate, ipy	Max. Pitting Surface	Max. Pitting Crevice
Monel	0.0026	0.007	0.002
Nickel	0.0010	0.015	0.008
Inconel	0.0002	0.017	0.008
Type 304 Stainless	0.0002	0.015	0.015
Type 316 Stainless	0.0001	0.006	0.007
Ni-Resist	0.007	....	....
Cast Iron	0.014	....	....

TABLE XXV

Specimens exposed 91 days in sulfite pulp after chlorination stage, temperature 80° F., pH 2.4. Residual chlorine 0.02 gpl.

Material	Indicated Corrosion Rate, ipy*
Monel	0.043
Nickel	0.0002
Inconel	0.0001
Type 304 Stainless	0.0001
Type 316 Stainless	0.0001
Hastelloy C	0.0001
Ni-Resist	0.023
Cast Iron	0.18

* Unfortunately, no observations of pitting attack were made, hence these data are only partially useful.

TABLE XXVI

Specimens exposed 106 days in sulfite pulp washer headbox after direct chlorination stage. Temperature 51° F., pH 1.5.

Material	Indicated Corrosion Rate, ipy*
Monel	0.0096
Nickel	0.019
Inconel	0.0011
Type 304	0.0001
Type 316	0.0001
Hastelloy C	0.0001
Ni-Resist	0.044
Cast Iron	0.13
Mild Steel	0.041

* No pitting observed on any materials excepting Carbon Steel which perforated (0.062") during test.

In succeeding bleaching stages, i.e., those employing hypochlorites, by and large, calcium hypochlorite solutions are used. Some mills use sodium hypochlorite. In general, the conditions are not quite as aggressive in the case of the calcium bleach. The reason for this appears to be the fact that the calcium bleaches tend to build up an insoluble protective scale whereas the sodium bleaches result in reaction products which are soluble. One sulfate mill which had been using calcium bleach solutions changed over to a sodium bleach and immediately encountered severe corrosion of Monel facing wires on the vacuum washer after the first hypochlorite stage. Monel has been giving satisfactory service while calcium bleach liquors were used. To investigate this problem, two corrosion test specimen holders were exposed in the vat, one at one end of the washer and one at the other end of the washer. These results are shown in *Table XXVII*.

It was reported by the mill that during the use of the sodium bleach, Monel wires lasted 4 days at the north end of the washer and Type 316 stainless lasted 60 days at the same end. Both Monel and stainless showed satisfactory service at the south end. Subsequent to this investigation the mill returned to the use of the calcium hypochlorite bleach liquors with a notable decrease in corrosion.

Other plant corrosion test results are shown in *Tables XXVIII* and *XXIX*.

TABLE XXVIII

Specimens exposed 42 days in headbox in sulfuric acid acidulation stage beyond fourth stage bleaching. Temperature 80° F., pH 4-4.5.

Material	Indicated Corrosion Rate, ipy*
Monel	0.0023
Type 304 Stainless Steel	0.0001
Type 316 Stainless Steel	0.0001

* No pitting observed upon examination.

TABLE XXIX

Specimens suspended over bleaching vats for 250 days exposed to atmosphere of bleach house. Temperature 80° F., avg.

Material	Indicated Corrosion Rate, ipy
Monel	0.0006
Nickel	0.0003
Inconel	0.0002(a)
Type 302 Stainless Steel	0.0001(b)
Type 316 Stainless Steel	0.0002(c)
Ni-Resist	0.003
Cast Iron	0.092
Carbon Steel	0.023

(a) Locally etched areas.

(b) Specimens pitted max. of 0.022" during exposure.

(c) Specimens pitted max. of 0.020" during exposure.

TABLE XXVII

PLANT CORROSION TESTS IN FIRST HYPOCHLORITE STAGE WASHER VAT

A. Specimens exposed for 72 days at north end of vat of first hypochlorite stage washer, temperature 100° F., pH 9.2, residual chlorine 400 ppm.

B. Same conditions as "A" above except specimens exposed at south end of washer.

Material	Ind. Corr. Rate, ipy	Remarks	Ind. Corr. Rate, ipy	Remarks
Monel	0.035	35-50% of spec. corroded away	0.032	Same as "A"
Type 316 S. S.	0.0016	Serious pitting under pulp deposit	0.0018	Same as "A"
Ni-Resist	0.016	Accelerated attack under pulp deposit	0.011	Same as "A"
Cast Iron	0.046	Accelerated attack under pulp deposit	0.029	Same as "A"

Head of inconel-clad steel sulfate digester built for Crossett Paper Mills, Crossett, Ark. by Wyatt Metal and Boiler Works of Houston, Texas.

The use of nickel containing alloys in zinc hydrosulfite groundwood bleaching systems has proven to be quite beneficial from the standpoints of equipment service life and pulp brightness. Recently corrosion tests were made in a zinc hydrosulfite bleach system and these results are shown in *Tables XXX* through *XXXIV*.

TABLE XXX

Specimens exposed for 209 days at bull screens (grinder effluent) and prior to the addition of zinc hydrosulfite. Temperature 150° F., pH 4.5.

Material	Indicated Corrosion Rate, ipy	Remarks
Monel	0.0011	Locally etched areas
Nickel	0.0014	Locally etched areas
Inconel	0.0050	Pitted and heavy local etch
Type 304	0.0001	Pitted 0.07"
Type 316	0.0001	No pitting
Mild Steel	0.0085	Heavy etch
Ni-Resist	0.0015	.....
Cast Iron	0.010	.....

The zinc hydrosulfite bleach solution is added to the pulp following the bull screens. Bleaching occurs in the retention tanks and following that that pulp is washed on Oliver washers. *Table XXXI* gives corrosion data developed at this point.

TABLE XXXI

Specimens exposed for 209 days in Oliver washer vat. Temperature 139° F., pH 4.2. The filtrate contains residual zinc hydrosulfite bleach.

Material	Indicated Corrosion Rate, ipy*
Monel	0.0014
Nickel	0.0042
Inconel	0.0001
Type 304 S. S.	0.0001
Type 316 S. S.	0.0001
Mild Steel	0.014
Ni-Resist	0.003
Cast Iron	0.011

* No pitting observed upon examination.

The pulp from the washers passes to knotter and *Table XXXII* presents corrosion data at this point.

TABLE XXXII

Specimens exposed for 209 days at knotter screens in zinc hydrosulfite bleaching process. Temperature 74° F., pH 4.5.

Material	Indicated Corrosion Rate, ipy
Monel	0.0044
Nickel	0.0047
Inconel	0.0005(*a*)
Type 304 S. S.	0.0001
Type 316 S. S.	0.0001
Mild Steel	0.007
Ni-Resist	0.007
Cast Iron	0.012

(*a*) Specimens perforated (0.031") during test.

White water used in the zinc hydrosulfite bleach system comes from the paper machine and the corrosion data shown in *Table XXXIII* were obtained by the exposure of test specimens in the white water chest.

TABLE XXXIII

Specimens exposed for 209 days in machine white water. Temperature 74° F., pH not stated.

Material	Indicated Corrosion Rate, ipy
Monel	0.0023
Nickel	0.0030(*a*)
Inconel	0.0001
Type 304 S. S.	0.0001
Type 316 S. S.	0.0001
Mild Steel	0.0032
Ni-Resist	0.0031
Cast Iron	0.0054

(*a*) Specimens pitted 0.005" during test.

Another test in different mill was made at the bleached stock washer and these data are shown in *Table XXXIV*.

TABLE XXXIV

Specimens exposed for 106 days in bleached groundwood washer headbox. Temperature 105° F., pH 3.5 to 4.0.

Material	Indicated Corrosion Rate, ipy
Monel	0.0008
Nickel	0.0010(*a*)
Inconel	0.0001(*b*)
Type 304 S. S.	0.0001
Type 316 S. S.	0.0001
Mild Steel	0.0030
Ni-Resist	0.0015
Cast Iron	0.0024
Hastelloy C	0.0001

(*a*) Specimens pitted max. 0.010" during test.
(*b*) Specimens pitted max. 0.017" during test.

In summary, the use of nickel containing alloys has been discussed with specific reference to the pulp and paper industry. Corrosion data illustrating the behavior of these alloys in specific environments have been given. It is worthy to note that corrosion data per se do not tell the whole story. One must of necessity consider other important factors such as mechanical and physical properties, forms available, ease of fabrication, weldability, the necessity of heat treatment for certain beneficial purposes and cost. As far as the corrosion data are concerned, a certain amount of discretion also must be used in their interpretation. For example: an alloy may show a corrosion rate of 0.0005 ipy in a certain environment and another alloy may show a rate of 0.0001 ipy in the same environment but it does not follow that the second alloy is fivefold better than the first alloy. In terms of 16 gauge material, the second alloy should last some 620 years while the first one will last only 124 years. Prior to the expiration of this calculated service life, probably a change or an improvement would have been made necessitating the replacement of the equipment.

Finally, of all the materials of construction useful in the pulp and paper industry, the nickel containing alloys as a group probably represents the most useful and most versatile group for economical use in the wide variety of corrosive environments encountered.

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Bottom Cone of inconel-clad steel sulfate digester built for Crossett Paper Mills, Crossett, Ark. by Wyatt Metal and Boiler Works of Houston, Texas.

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The Sutherland Single Rotation Disc Refiner*

LIONEL M. SUTHERLAND[1]

Owing to the limited amount of time available for discussion on the subject of stock preparation, I shall immediately start with a description of the Sutherland single rotation disc refiner and its features of construction.

Description of the Sutherland

Figure 1 shows a typical cross-section of a Sutherland refiner. The base, made of close grained cast iron supports the rotating and stationary assemblies. The stationary assembly consists of a feed tube on which reading from left to right are the locking wheel (1), the hydraulic cylinder (2) piston, piston rings (3), the stationary head (4), keyed to the feed tube and the stationary disc which in turn is bolted to the head. The rotating assembly consists of the rotating disc, rotating head (5), nickel steel shaft (6), stainless steel sleeve, inboard radial bearing (7), the Kingsbury oil film thrust bearing (8), and the outboard radial bearing (9). The coupling which is self-aligning type and well known to many of your mills is not shown in this illustration. A hood is mounted into position over the discs and assists in guiding the pulp out of the pulp chamber and to the machine chest, fan pump or tray box as the case may be.

At all points where the stock comes in contact with the refiner, the material is of high grade stainless steel. This includes the feed tube, both rotating and stationary heads and discs, lining of the pulp chamber and also of the hood. The equipment has a built-in lubricating system comprising a storage reservoir or sump, gear pump, oil cooler, oil filter, electric safety switch and the necessary piping to return the excess oil to the storage sump. The hydraulic system which has previously been mentioned in connection with the stationary assembly consists of a starting switch, hydraulic motor and hydraulic pump; the necessary piping and a four-way hydraulic valve to direct the flow of oil so as to either advance the stationary head towards the rotating side or to back it off depending on whether the operator desires a greater or lesser power load on the refiner. A locking wheel serves to hold the stationary assembly in place once the desired setting as to inlet pressure and power has been obtained. The weight

[1] Sutherland Refiner Corp., Trenton, N. J.

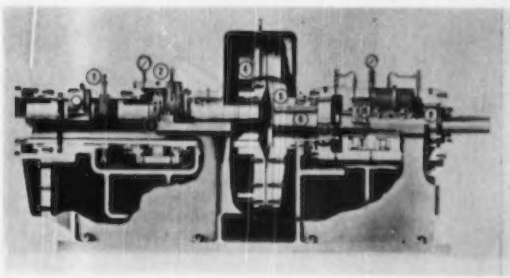
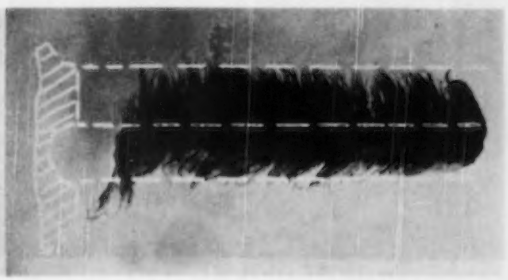


Figure 1.



Typical Cross Section of Sutherland Refiner.

Figure 2.

of a 42" Sutherland refiner is approximately 22,000 pounds of which nearly 6,000 pounds consists of stainless steel alloys while the 48" Sutherland refiner weighs 27,500 pounds and has approximately 8,000 pounds of stainless steel alloys in it. This is an indication of the rigidity and strength of this unit and also is the basic reason why such remarkable records of low maintenance costs are being established by this equipment. Other than disc regroovings, very little maintenance of any sort is required beyond the periodic renewing of the lubricants and on rare occasions the hydraulic cylinder. Alemite-Zerk fittings are used for supplying grease to the feed tube bearings and grease seals on the bearing cartridge.

The characteristics of the refiner besides rigidity are the accuracy of machining which is required to give a deviation of not more than one to two thousandths across the face of a 42" disc. Aside from this accuracy of machining, all parts are assembled to minimum tolerances. This is true for a number of reasons. Mainly, that a high degree of uniformity in refining requires control at all points along the line which includes cooking of pulps and also consistency control and ease of control of the refining equipment. In this respect, the Sutherland refiner is unique in that it can readily be reset by means of inlet pressure and power readings back to the same point which had been previously utilized in making the same grade of paper from the same pulps. Operators rapidly learn where these units should be set so as to obtain a desired result.

One other feature which leads to low maintenance cost is the fact that the bearings on the Sutherland refiner are oversize for the requirements of the job. The inboard radial bearing, for instance, has an average life of twelve years and although a number of them have been in operation over 10 years, we do not know of a single case of failure of an inboard bearing. The same is true of the outboard radial bearing while the Kingsbury oil film thrust bearing is well known among bearing engineers for its durability under extremely high thrust loads.

Other features pointed out above as to the materials of construction are also instrumental in keeping maintenance costs at the lowest possible point. In Southern kraft mills, maintenance costs for these refiners including ultimate replacement of new discs after a matter of 15 years is less than 5 cents per ton compared to figures of conical refiners from 20 to 30 cents per ton and for other types of refining equipment from 16 cents per ton and up.

Stock Preparation

The next question and the prime purpose of this meeting is to discuss preparation of fibers, which properly leads to a definition of refining. Generally speaking, refining may be said to be the application of energy, usually mechanical, to a pulp suspension so as

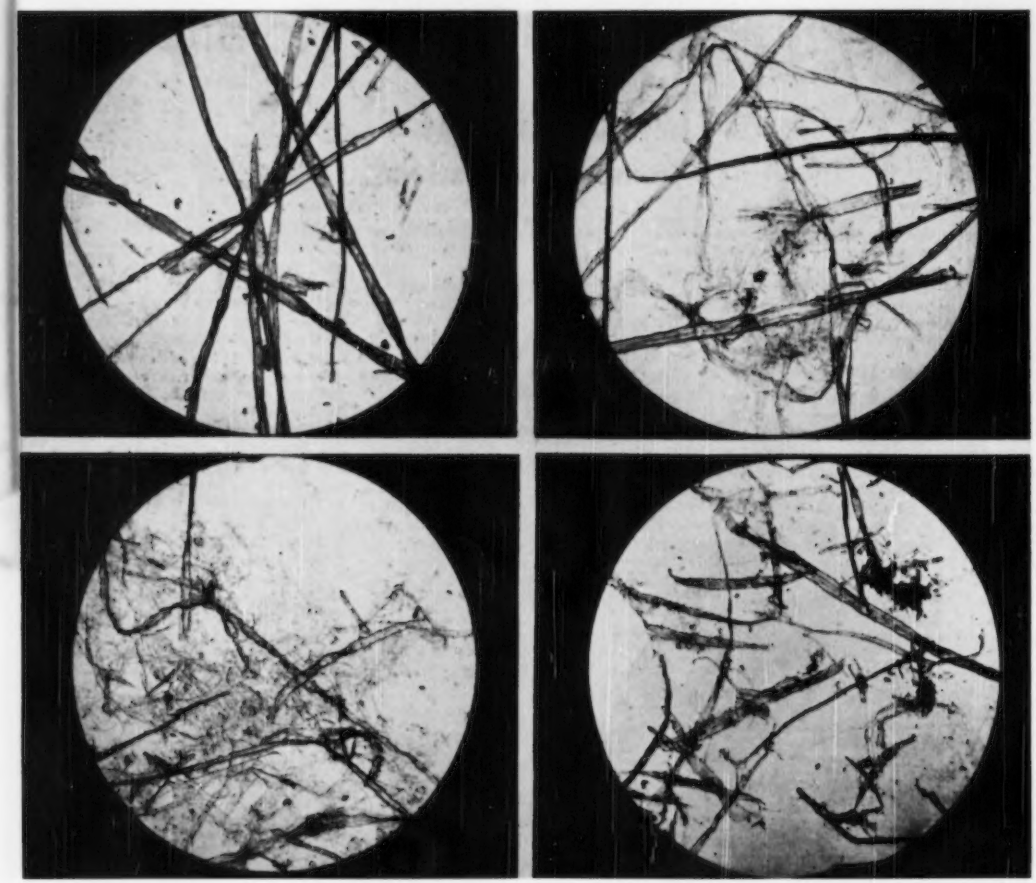


Figure 3. Raw Kraft Pulp. Figure 4. Bag & Wrapping. 80 WMS. 3 GM. Figure 5. Asphalting. 200 Williams. 3 GM. Figure 6. 2 Jordans. 165 HP each.

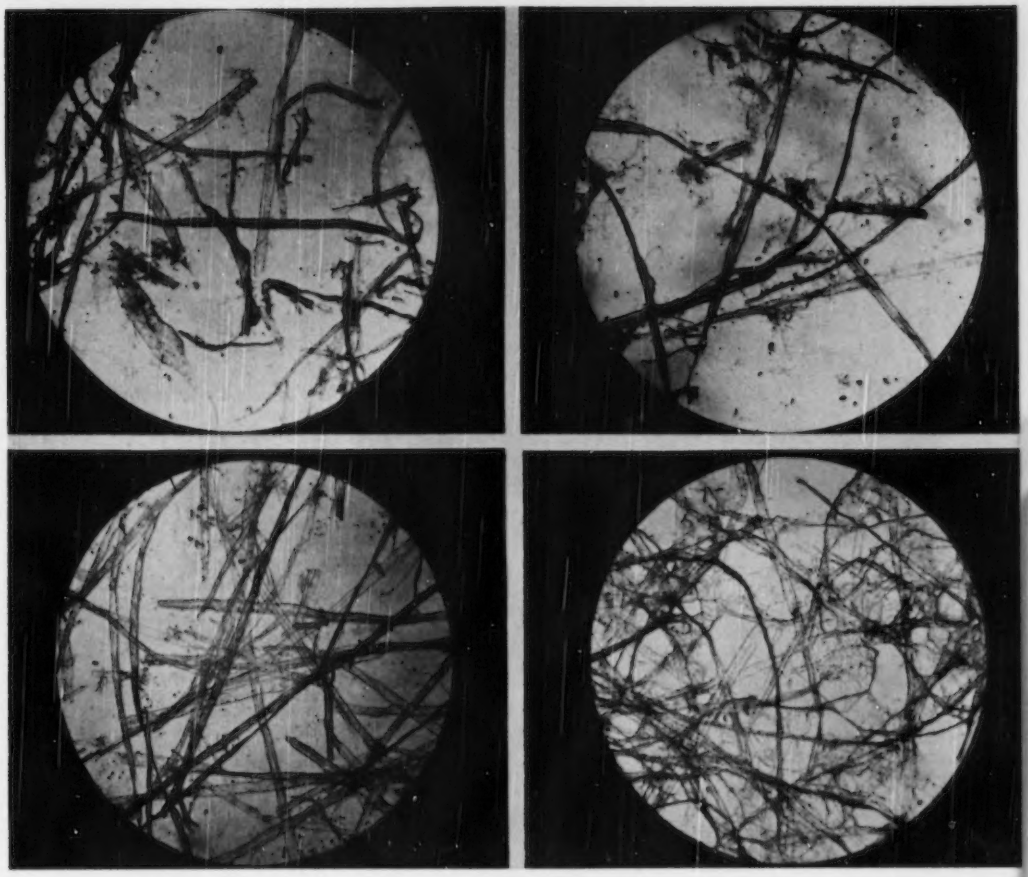


Figure 7. 1 Jordan. 200 HP. Figure 8. 1—32-inch Refiner. 155 HP. Figure 9. Glassine Sulphite (Dexter). Raw Stock. Test Run 112. Freeness—725. Williams 27. 4 gm. 20° C. x60. Figure 10. Glassine Sulphite (Dexter) Test Run 112-1. Freeness 105. Williams 27. 4 gm. 20° C.

to produce characteristics in the stock which makes it suitable for a given grade of paper. Swelling, which is apparently one of the characteristics produced by refining, may also be accomplished by chemical means.

In refining, the following effects are usually obtained though not all are desirable or necessary:

(1) Cutting or shortening of average fiber length.

(2) Fibrillation — fraying out the component fibrils from the fiber.

(3) Hydration — the chemical, mechanical or combined chemical and mechanical treatment of fibers other than cooking and bleaching, prior to sheet formation; it relates especially to altered sheet characteristics including strength, density, opacity, formation, etc. Effects (1) and (2) above may be grouped together under the classification of "increase in surface area."

Cutting is resorted to as a means of getting the desired formation, usually with a considerable sacrifice in other desirable qualities. It is our experience that good formation, if required for a particular grade of paper, with a minimum of fiber shortening, can be more easily and cheaply obtained by thoroughly beating the fibers first and then using adequate amounts of water on the wire. We advocate low head box consistencies and since Sutherland stock has a higher drainage rate for any degree of strength development, as compared to other commercial equipment, including beaters, increased machine speeds and better strength tests become possible.

Various degrees of fiber fibrillation are shown in the photomicrographs. *Figures 2* to *11* inclusive.

While "hydration" has been defined above, there are numerous ideas and theories as to the mechanism involved, i.e., chemical, physical or a combination of the two; the facts have not been firmly established although much progress is being made.

The major difference between a Sutherland and other types of commercial equipment is illustrated in *Figure 2*, which is a photomicrograph showing a bundle of fibers taken at random from a refiner which had been shut down under load. The water was allowed to drain off over a weekend shutdown and this bundle of fibers was picked out of a groove. It shows how the fibers are combed and teased across the bar and likewise shows the extremely small gap existing between Sutherland discs in operation. This, also, shows the necessity for the accuracy which is built into our unit.

Operating Results

The next set of photomicrographs shows raw kraft *(Figure 3)* followed by the same kraft pulp beaten down to about 375 cc Canadian standard *(Figure 4)*. The refined pulp was used for bag and wrapping grades of 30 pounds weight. The papermachine was run at a speed of 1370 feet with six refiners on the line producing approximately 30 tons per 42" refiner. The refiners

Figure 11. Glassine Sulphite (Dexter). Test Run 112-5. Freeness—145. Williams 27. Agm.—20° C.

were pulling an average power load of 295 h.p. or 175-180 KW hrs/ton. The next slide *(Figure 5)* shows the same raw kraft refined to approximately 180 cc Canadian standard freeness by six 42" refiners with an average capacity of 26 tons pulling 337 h.p. or 235-240 KW hrs./ton producing 153 tons per day at a rate of 1170 feet making waxing and asphalting grades of kraft paper. You will note the marked extent of the fibrillation in both of these samples and you will further note that in most cases the fibrils are long and drawn out instead of cut up and that they also appear to be tied in a sort of a network with other fibrils instead of being more or less discrete particles. This is a single pass operation with the Sutherland where no other refining has taken place previously and no recirculation or recycling was used. This is a hard pulp cooked for liner board with a $KMnO_4$ number of 28-32 and yield about 47-48 percent.

The next slide shows a comparison between a refiner, two jordans and one jordan on the same furnish taken the same morning in a board mill running on patent coated. This equipment was used for refining top liner and it illustrates very clearly the differences in the stock. In the case of the two jordans *(Figure 6)* each one was pulling 165 h.p. or a total of 330 h.p. The single jordan *(Figure 7) which was* operated because one of the first two mentioned had broken down was operated at 200 h.p.; the refiner *(Figure 8)* was operated at 155 h.p. Tonnages in all cases were the same. The refiner quality was markedly superior to that obtained by one jordan and showed superior bend when compared to the board manufactured with two jordans.

Microscopic studies of these samples were made with the following results: The number average length of 300 fibers measured from these pulps with one jordan using 200 h.p. was .8 mm. For two jordans it was .9 mm and for the refiner it was 1.0 mm. It should be pointed out that this was a mixed furnish consisting of a small percentage of West Coast pulp which is very long fibered and imported sulphite unbleached and an eastern hardwood pulp. However, when the differences were calculated on a weight average length basis based on the assumption that all of the fibers were of equal width, the weight average length for the one jordan was 1.4 millimeters, for two jordans, likewise 1.4 millimeters and for the refiner it was 1.7 millimeters. This phenomenon without doubt, accounts for the fact that bend which is very important in patent coated and similar grades is very much better with Sutherland stock than with the usual types of equipment used for this purpose, when you further consider the uniformity of fiber treatment resulting from the close disc clearances prevalent in a Sutherland.

Upon a study of the original photomicrographs, it is rather easy for someone reasonably familiar with Sutherland operating performances to pick out which of these samples represents the refiner, the single jordan, and the two jordans bearing in mind our ability to do less fiber shortening than conical refiners. It is interesting to note that the most highly cut sample as observed and by measurement is that of the single conical refiner using 200 horsepower which means of course that it was set up very hard in an effort to do the work that would ordinarily be required for the two units.

The next slide shows an unrefined Mitscherlich sulphite *(Figure 9)* used for the manufacture of glassine. The second is that of the same sulphite beaten down to glassine *(Figure 10)* and the third slide *(Figure 11)* shows the same pulp beaten to a stage below that of commercial glassine in our laboratory refiner in a single pass—no recirculation whatsoever. In each of the cases of the refined stock, notice the major extent to which the fiber length has been retained and, also, the extent to which the fibrillization has occurred. Apparently, certain fibers have been laid open and exposed to the swelling effects of the water very much the same as if a rope had been thoroughly frayed with a hammer. An interesting thing to the mill in question was the extremely good retention of tear and the fact that this stock developed a very high degree of blister.

For over a year on pilot plant operations, we have been producing a highly "hydrated" pulp from sulphite screenings for inclusion as a binder in insulating board and much to our surprise when samples of the refined material were received in our laboratory we obtained a typical glassine blister on hand sheets.

Flexibility of the Sutherland

Comment is frequently made that the Sutherland refiner is not flexible. This, however, can be challenged on a number of grounds and, of course, depends in part upon what you define as flexibility. For example, in the first week of operation in a mill which had no prior refiner experience 28 separate grades of paper were made, including twisting and the results were highly gratifying to the mill. Subsequently, this machine has been converted to .009 corrugating board and, as a result of successful performance since last fall, an additional refiner will shortly be shipped to this customer. Nor can it be said that we are inflexible on the grounds that we are not making a wide variety of papers. It is very freely admitted today that the Sutherland is highly suitable for kraft liner board. In view of the fact that we are making in excess of 85 percent of the kraft liner board made in the South, most of it without the aid of any other refining equipment, this speaks for itself. However, we are making a great many other grades. For example, carbonizing paper has been made with Sutherland refiners alone; also, cover paper, map paper, bonds of various grades and many other grades of white specialties, book, mimeograph, ledger, insulation, twisting, etc. not to mention kraft papers such as multiwall, gumming, light weight asphalting, bag and wrapping, etc. It should be pointed out that papers made wholly with Sutherland refiners in the South are recognized as being top quality papers in every respect. This has been confirmed by people who are completely independent of the U.S. Industry, i.e., European visitors and importers who are in competition with these papers in the U.S. market.

Over 6000 tons per day, at average daily capacity, of kraft liner board and over 600 tons of kraft papers are now being made entirely with Sutherlands. On a 340 day basis this is excess of 2 million tons of liner board and 200,000 tons of kraft papers and does not include machines which are partially equipped with refiners.

Three liner board machines entirely Sutherland equipped have exceeded 700 tons production each per 24 hours, and one mill has established what is believed to be a world record of 838 tons in 24 hours on one paper machine.

Flexibility in handling various kinds of furnishes may also be cited. Use of Sutherlands includes neutral sulphite and asplund fiber for .009 corrugating, Eucalyptus pulp for a variety of grades, 90 percent hardwoods and pine for book and cover; mixed furnishes for patent coated top liner, 100 percent Douglas fir and semi-bleached pulp for food container. This is reliably believed to be the only 100 percent Douglas fir paper now being produced.

We are, also, producing nearly 2000 tons/day of high yield kraft pulps with yields in excess of 55 percent where the hot brown stock from the blow tank is defibered at temperatures of around 200°F.

Another form of flexibility is that of hook-up. The Sutherland refiners are hooked up in a number of ways, either discharging by gravity into a machine chest—we prefer a small machine chest so as to make rapid changes in the stock on the wire—or discharging directly from the refiner to the fan pump or tray box on the machine—this has given highly satisfactory results particularly in view of the fact that the operator under these conditions has complete and immediate control of the stock at his finger tips.

Another phase of flexibility which might be considered is the fact, speaking generally, that when mills desire to change the grade of paper they are making, they do not change the tackle in the refining equipment; they may change the number of pieces of equipment used or they may change the input power to the equipment, but basically their changes in the grades of paper are made by changes in the furnish by varying the portions of long and short fibers, de-inked papers or going from bleached to unbleached, or varying the percentages of these pulps. In that respect, the Sutherland refiner is obviously as flexible as any other type of equipment.

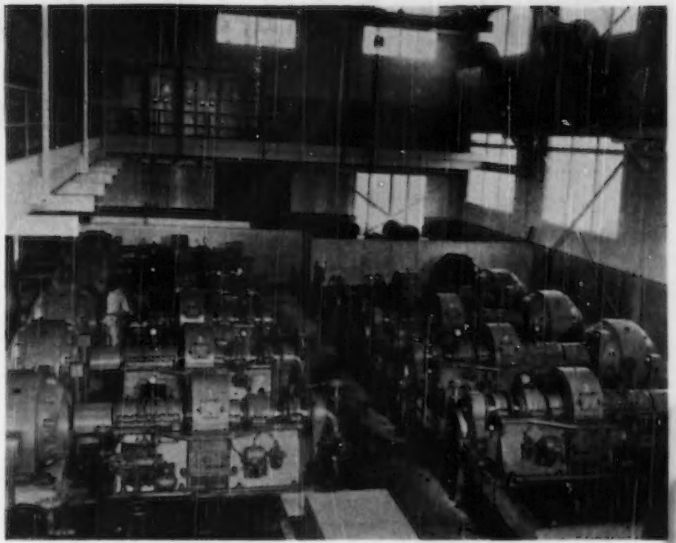


Figure 12. Modern Sutherland Refiner Installation.

Furthermore, should a change in discs be desirable, it could be effected in a matter of an hour to an hour and a half on a large refiner as compared to a several hour job in the case of the most of the other types of refining equipment available on the market.

In conclusion, experience has shown that the Sutherland is build from high quality materials to exacting standards, which results in low cost operation to the purchaser. It performs the beating and refining functions of hydration and fibrillation with maximum retention of fiber length. It does this, furthermore, at a low specific power input for a given grade of pulp and grade of paper. Usually it takes but half the power required by conical refiners.

The unit is essentially a high production piece of equipment but has great flexibilty due to finger tip control over throughput and applied power. Many kinds of woods—native and foreign—cooked by the kraft, soda, sulphite and neutral sulphite methods are processed into a wide variety of papers by Sutherlands in most paper making countries of the world. These machines have demonstrated their flexibility in the hands of paper makers.

For years we have advocated "Before you invest, investigate" and it's still a sound idea!

PEOPLE

CONTINENTAL CAN CO. reports that J. S. Snelham, formerly vice-president and comptroller was promoted to the newly created position of vice-president in charge of finance. Reporting to Mr. Snelham now will be the treasurer, comptroller, and general managers of traffic and purchases.

The following two promotions were also announced. G. J. Barry, from assistant comptroller and assistant treasurer to comptroller; and H. A. Swertfeger, from assistant to the vice-president and comptroller to assistant comptroller.

EASTERN CORP., of Bangor, Maine, has appointed Kenneth W. Henderson Advertising Manager. He was formerly associated with Interchemical Corp. as advertising manager of their Standard Coated Products Division.

GARDNER BOARD AND CARTON CO. has promoted W. W. Griest to the position of statistician. Griest has been associated with the firm for 25 years. Prior to joining Gardner he was associated with Armco Steel Corp.

DR. R. M. HUSBAND, of Regina, Sask., has been appointed assistant professor of cellulose industries in the Department of Chemical Engineering at the University of Toronto. He will direct the university's studies of the new industries that have developed from Canada's pulp and paper industry.

Dr. Husband is a graduate of the University of Saskatchewan and obtained his Ph.D. degree in Montreal. He has been engaged in research work at the Ohio State University.

WEST VIRGINIA PULP AND PAPER CO. has announced that Paul B. Lacy, manager of the company's plant at Covington, Va., will relinquish his active duties as mill manager January 1, 1951. Mr. Lacy will remain with the company in the capacity of special consultant for long-range planning.

E. Crawley Williams, Jr., assistant manager in charge of production at the Covington plant, will succeed Mr. Lacy as mill manager.

Coating Papers on the Fourdrinier and Press Sections*

C. W. Steele[1]

Lightweight coated papers, only a few years ago considered an impractical dream, are today a commercial reality. A 22 lb. basis weight coated two sides printing paper has been produced commercially by applying 4 lb. of coating to an 18 lb. rawstock. While this operation can hardly be called "coating" in the strict interpretation of the word, the application of a small amount of coating color to a light sheet imparts many of the desirable printing qualities inherent in coated papers.

The type matter and halftones are brighter and sharper, ink absorbency reduced, show-through decreased and the smoothness and feel of a coated sheet is obtained in a surprising measure in comparison with an uncoated sheet of equal basis weight and fiber composition.

In increasing the weight of paper ranging in ream weight from a 20 lb. to 40 lb. per ream coated two-side sheet, the operation changes from that of "surface filling" to coating. It is the printing requirements and the production of this grade of paper by a method of coating on the foundrinier and press sections of the paper machine to which I shall confine my remarks.

The production of lightweight coated papers by the application of coating to a wet web at the dandy roll and at one of the presses of a fourdrinier machine demands the greatest cooperation between papermaking and coating departments of any of the machine coating processes. The reason for this rigid requirement is that coating in this manner is essentially a part of the sheet forming and pressing operation.

It is an accepted and well-known fact among persons engaged in the production of coated paper that the character of the raw stock can greatly influence the quality of the coated paper. This influence is due to its effect on the coating lay, pick strength, smoothness, color and ink absorbency.

In producing lightweight coated paper on the paper machine, the properties of the stock and coating are so intimately correlated to the final sheet properties that some of the precepts of both papermaking and orthodox coating have to be cast aside and the product studied objectively. Needless to say, this puts a strain on the prejudices of both the papermakers and the coating technicians.

Demand for Lightweight Coated Papers

A thorough knowledge of the market and its requirements should be known to manager and superintendents alike in order to plan development operations and to produce an acceptable paper for the customer's use.

There is an increasing demand for lightweight coated papers in the publication grades. This demand is actuated by economic pressure on the publisher who must have more printing area per ton of paper in order to reduce overall costs. It also is actuated by technical consideration in the case of catalogues and metropolitan telephone directories where minimum weight and bulk are important factors.

In the face of reduced weight per ream, the printers must maintain high printing quality. Therefore, strength, opacity and smoothness of the paper also must be maintained.

The splash of color etant everywhere today—in advertising, in home furxnishings and in decorative buildings—is reflected in all types of printed papers, including part of the daily newspaper.

Color printing is most effective on coated paper. For this reason, the market demand for the lightweight coated paper has epanded to, and has become firmly established in, the mail order catalogue field where merchandise is sold largely on the merit of its presentation. The impending postal rate increase for 2nd class mail is a powerful factor in the demand for reduction of ream weight.

The introduction of attractively printed "digest size," or pocket edition, magazines and technical journals was based on the economics of printing area per ton of paper, the postal rate per copy, and convenience to the subscriber. A light coating or surface treatment of the sheet, if only sufficient to offset two-sidedness, aids in giving the paper the quality necessary for these publications. In fact, the trend of all papular magazines is toward the use of lighter weight coated papers for purposes other than 4-color inserts.

The large metropolitan telephone directories are becoming so voluminous that publishers are faced with the necessity of reducing bulk or splitting a directory into several parts. Splitting a directory would seriously inconvenience subscribers and would be costly to the publisher. Reducing the bulk seems the more feasible procedure. Yet good presentation of advertising matter, which bears the brunt of publication costs, is an important consideration. Also, opacity must be maintained.

Controlling ink penetration, and securing high retention of titanium dioxide or titanium-bearing pigments by coating on the "wet end" have given results on production trials with directory paper that point a way to the solution of this problem.

The familiar rotogravure sheet in the Sunday editions bids for a large share of coated paper, This acceptance is because of the gloss and brilliance of color achieved with it, and because of the saving in the amount of ink required per ton of paper printed.

The increased use of rotary offset presses for large quantity production also has increased the demand for lightweight coated papers. Here it is because of its freedom from lint and fuzz, and its reduced ink requirement.

Unfilled demands for lightweight coated paper eist in air mail and foreign editions of magazines, a modified Bible type for encyclopedias and handbooks, and even for newsprint. A newspaper plant in a nearby city has found that colored advertising pays dividends to the advertiser sufficient to warrant the higher cost of such paper. While there is yet much to be desired, the idea is born and will grow. The next step will be a demand for a better surface for half-tone color productions.

Product Requirements

All of the trades which have been described have the following requirements in common:

1. Lightweight—in the range of 20-40 lb. per ream to obtain greater printing area per ton; and, in special cases, to reduce bulk.

* Presented at the 31st Annual Convention of Association, Inc., held at the Edgewater Beach the American Pulp & Paper Mill Superintendents Hotel, Chicago, Ill., June 8-10, 1950.

[1] Coating Supt., Combined Locks Paper Co., Combined Locks, Wis.

STOP MOLD

on soap wrappers with SANTOBRITE

It is easy to control organisms that cause soap wrappers to mold. Low concentrations of Monsanto Santobrite (sodium pentachlorophenate, technical) prevent mold damage in casein-coated paper. It is recommended that the Santobrite be added during paper manufacture.

As little as 2.0% of Santobrite, based on the dry weight of casein in the size, gives complete protection against surface microbiological growth. And, since the organisms also flourish in adhesives used on soap wrappers, Santobrite should be incorporated into them.

If you have a customer whose sales are slowing down because his soap wrappers are molding, go to his aid with Monsanto Santobrite. For information, mail the coupon or contact the nearest Monsanto Sales Office. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1764-J South Second Street, St. Louis 4, Missouri.

Santobrite: Reg. U. S. Pat. Off.

Don't confuse Monsanto Santobrite with lower chlorinated phenols. Santobrite is the sodium salt of pentachlorophenol. It is essentially nonodorous and nonvolatile. Monsanto specifications maintain a high standard of purity which rules out contamination of Santobrite by any appreciable quantities of lower chlorinated phenols usually associated with undesirable odors.

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Company.....

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City..... *Zone*..... *State*.....

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2. Opacity—necessary for clarity of printing and practical reduction of show-through of the printing on opposite side.

3. Minimum strike through or penetration — closely related to show-through in lightweight paper. Yet coating should be of such nature as to be wetted easily by the ink.

4. Minimum two-sidedness—in appearance, printability, and absorbency.

5. Sufficient strength—usually printed on high speed rotary presses. Sheet must be level and without streaks as unit stress across the web is high.

6. Finish and smoothness—must be high for rotogravure and halftone printing. Not a necessary requirement for some types of letterpress and offset work.

7. Brightness—must be maintained as high as economically possible commensurate with grade of paper.

8. Low cost.

The papermaking problems of consequence involved in producing a sheet that will meet these market and technical requirements are: overcoming the two-sidedness resulting from flotation of filler and fines to the top surface of the web and removal of filler and fines from wire side by natural drainage and induced suction; obtaining on both top and bottom surfaces the effect of a highly loaded sheet without the attendant shortcomings; control of ink absorbency by equalizing it between the felt and wire side of the sheet; obtaining tailor-made sheet surfaces of various and unlike characteristics to meet smoothness and absorbency requirements for rotogravure; moderate oil resistance for heatset printing; a harder surface for four-color halftone; and wet rub resistance and freedom from lint and fuzz, with a high pick test, for offset.

Earlier Methods of Machine Coating

These basic requirements for a lightweight machine coated sheet are not entirely new. Several methods have been developed to achieve them. For example: The Fair & Strasser methods were designed to apply clay and starch, and other materials to the top side of a sheet while being formed on the wire. The Paraprint process was designed to apply filler and fines to the wire side of a sheet in order to replace such of these materials as are normally lost by drainage and action suction boxes, thereby correcting two-sidedness.

Lightweight coatings also have been applied by size presses and by water boxes on machine calendars. Control of coat weight with such equipment, however, is difficult, due to variation in absorbency, temperature, viscosity of color, etc.

Some of the modern machine coaters can apply coatings in the lower range of 2 lb. to 3 lb. per ream per side. However, the concidental rewetting of a light sheet of rawstock, weighing 18 lb. to 30 lb. per ream, induces problems and conditions which seriously affect production unless the sheet is supported by a blanket, dryer surface, or some other means immediately after the coating color is applied.

Operational Requirements

Many methods of producing coated paper, and many production trials were made on a fourdrinier type paper machine to produce an acceptable and desirable light-weight coated product. From a study of product quality, production rate, control of coat weight applied and uniformity of application of the coating, it was found that several design and operation specifications obtained. These specifications,, summarily, are coating application means or systems that: (1) would apply from 2 lb.-6 lb. coating weight per ream plus or minus one-half pound; (2) would distribute this extremely lightweight coating very uniformly over the surface; (3) would apply the coating where the light sheet would be supported so that the stress on the web would be minimized or absent, and constant production thereby insured; (4) would reduce loss of pigment to the minimum as titanium is usually required to achieve satisfactory opacity; (5) would apply the coating color at thesame tangential or surface velocity as that of the web.

The Coating Process

To meet the market demand for a lightweight coated sheet, and without rebuilding the paper machine, Combined Locks Paper Co. evolved a process which operates at an economical speed and embodies substantially all of the requirements described previously.

The process and equipment are described in patents #2,398,843 and 2,426,043 obtained by G. D. Muggleton and A. Piepenburg. Essentially, it is the uniform application at the fourdrinier part of the paper machine of a low solids clay and binder suspension in a thin liqui sheet across the top of the dandy roll by means of a flow box and a specially designed inclined apron. The flow is regulated so that the coating just fills the meshes of the wire covering. This suspension is deposited with printing-like action to the top of the wet web as it passes under the dandy. Thereby, the coating is applied to the top or felt side of the sheet without disturbing formation.

Because of convenience and accessibility, the wire side is coated on a reverse-running third press. Here, the clay and starch suspension is metered between the nip of the top press roll and applicator roll; the surface tension lines smoothed ou by proper smoothing rolls; and the coating color deposited on the wire side of the wet web as it enters the press nip. The press felt carries the softened web through the nip without breaks.

Then, the web is picked off the press, carried through a smoothing press, and delivered into the dryer section where it is dried in the conventional manner. The process is simple; and the equipment inexpensive and rugged, yet capable of closely controlling the weight of coating applied. The machine tender, in the course of bringing the sheet over the machine, has three comparatively simple operations to perform:

1. Occasional adjustment of flow spreader slice to correct coat weight across the web.

2. Make and break contact of coating roll on the press by air controls.

3. Start and stop the coating color pumps.

The web is supported at both points of application. So, nothing short of a flooding on of the coating can break it.

Application at Dandy

On the average lightweight paper, the amount of coating that can be applied by the dandy roll printer and controlled to close tolerance can vary from 1 lb. to 6 lb. per ream. However, as much as 12 lb. has been applied on a slow running 60 lb. sheet.

Basically, the coating is a low solids clay-starch suspension containing the usual ingredients in approximately the same percentage as used on conventional coating machines. The solids, in the range of 1% to 5%, are conveniently measured by apparent specific gravity. They are controlled automatically by a differential mercury manometer and bubbyer tubes set in a sampler near the coating supply tank.

A conventional coating mix of clay of the desired grade and lightly converted starch, along with waxes, soaps, defoamers and other additives is prepared at 50% solids. This heavy mix is pumped, at a rate indicated and controlled by the specific gravity instrument, into a constant head mixing tank. Here, dilution is effected by thorough mixing with with filtered fresh water that is supplied at controlled temperature. The adjusted low solids coating color thus produced is pumped to the flow box of the spreader.

A constant head is maintained in the spreader head bo at all times. The amount of fluid necessary to obtain a smooth unxiform unbroken film as the color falls off the lower lip of the inclined apron to properly fill the meshes of the wire covering of the dandy roll is controlled by the slice opening. The adjustment of coating weight applied at any point across the width of the web is also controlled by adjusting the slice.

It is desirable to hold the flow rate to the minimum without breaking the film as it leaves the lip. This practice prevents the overfilling of the dandy, which, if it occurs, throws free water and, in turn, causes formation streaks down the length of the web. Also, the use of less water permits a higher solids coating color to be used for a given weight applied, thus the coating lies more on the surface.

It also relieves the suction boxes of removing as much free water from the sheet as would otherwise be necessary. Between 0.25 and 0.30 gallon of a 2% solids coating color is used per inch of machine width per minute.

The coating color leaves the slice in a fairly smooth sheet. It flows down the 10 in. apron, which is inclined at about a 45° angle, toward the drye end of the machine.

To make sure of equality of flow over each unit of width across the machine, a series of perforated baffles are positioned about 2 in. apart on the inclined apron. These baffles redistribute the flow laterally and even out waves or light streaks causes by obstructions at the slice. The color then flows to the sharp lower lip of the slice and falls in an unbroken sheet for about ½ inch to the upper surface of the revolving dandy roll.

The velocity of the dandy roll surface cuts the film and prevents the fluid from falling through the meshes. In fact, a slight excess of fluid causing it to roll on the surface at the point of contact, is desirable. It insures the filling of the meshes.

The coating color, although of extremely low solids content, has sufficient surface tension to be held in against the centrifugal force occasioned by the revolving dandy roll. However, it is deposited on the wet web as it passes under the dandy by a printing action similar to that of a rotogravure cylinder of a printing press. In fact, the coating is completely removed as the web leaves the dandy, the scouring action of the clay keeping it clean, and the sheet formation is not disturbed.

To achieve the best transfer results, it is necessary to run the sheet a little ahead of the dandy than is ordinarily done. After adjusting the flow rate for a given machine speed, the coat weight is increased or decreased by increasing or decreasing the solids content of the coating color. To apply 3 lb. of coating to the top side, the solids are set at 1.025 sp. gr. on a machine running 660 fpm.

Press Application

Coating the wire side at the third press section involves the use of a coating color of essentially the same ingredients as the color for the dandy. On the overage, depending upon the coat weight desired, the solids are from 28 to 42 per cent.

The solids are also measured and recorded by specific gravity measuring instruments. The specific gravity varies from 1.20 to 1.35 plus or minus .02 of a degree. Here, as in the dandy, close control of the coating color solids are necessary to obtain close control of the coat weight applied.

The adjusted "color" is pumped to the nip of pocket rolls formed by the top press roll of a reserve press and small applicator or squeeze roll. The applicator roll meters and spreads the coating color uniformly across the press roll as it leaves the nip.

The surface tension lines, which result when any two coating roll surfaces separate, are smoothed out by a proper smoothing roll. The coating color is then carried down to the press nip. Here it is applied to the wire side of the wet web which is carried through the press nip on the bottom press felt.

The coat weight is adjusted by the pressure imposed on the applicator roll against the large top press roll, and by increasing or decreasing the solids content of the color.

Weight adjustment through the use of applicator rolls is very limited due to crown, softness of the rubber, and feasible nip pressure. Applicator roll pressure is varied primarily to equalize the coat weight applied on the front and back edges of the sheet. The manipulation is made by adjusting the nip pressure front to back.

The desired coat weight per ream is obtained and maintained principally by controlling the solids of the coating color supplied to the coating mechanism. The coat weight applied by the press is usually 20 per cent to 25 per cent lighter on the press than that applied by the dandy coater because penetration of the color is somewhat less, due to the drier sheet.

Usually, ¼ to ⅓ more adhesive is carried in the color applied on the dandy than that carried on the press in order to offset the inherently softer surface and greater ink absorbency of the felt side. Brightness is equalized between the felt and the wire side by a slight changing of the coat weight or by the addition of a small amount of titanium in the dandy coating color.

The distribution or "lay" of the clay coating on the felt side is extremely uniform. It is without pattern of any kind, even when scrutinized with the aid of "black" or ultraviolet light.

The "lay" of the clay coating on the wire side also is very uniform. However, there is a slight longitudinally striped pattern which can be found by "experts." Also, a press felt may sometimes refect its pattern, if the weave of the felt is too coarse.

Advantages of Process

Some outstanding advantages of the method became evident as the operational problems "smoothed out."

It was demonstrated that 20-24 per cent ash sheet could be produced without the usual wire wear resulting from heavy loading. Here, of course, little or no filler is used in the raw stock furnish. This low filler content of the stock on the wire (usually 4-6 per cent) also allows higher machine speed as the stock is freer than it would be for a conventional sheet of equal ash content.

Obviously, the whitewater system is virtually clear of filler pigments. There are no pitch troubles, and no sticking of fiber on the presses, and the rolls run exceptionally clean.

Retention of filler, the principal objective of the process, can be efficient thus making the use of titanium economically possible to obtain the opacity required in lightweight grades. The brightness of a 40 lb. rotogravure sheet was increased as much as 6 points by the application of 3 lb. coating per side. Other weights gave similar results percentagewise.

With the exception of the first few dryers, which must be kept at a temperature of around 160° Fahr. to prevent sticking, the drying system of the paper machine functions normally with some saving in steam. No doubt, this operational characteristic is due to the free drying quality of the clay, and the low starch content required to bind the clay in this type of paper. Only 8 to 10 parts of starch to 100 parts of clay on press coating, and 12 to 15 parts of starch per 100 of clay for dandy coating is used normally.

The two-sidedness in ink receptivity can be controlled at will. It is done by changing the adhesive content of either coating color. On the other hand, it was found that "dead stock," poor formation, wet streaks and other operational shortcomings multiplied themselves in one or another of the coating application positions, or in the dryer sections. For example: A small lump of dead stock will form a depression around itself in going under the dandy and when going through the press. At each position it will pick up slightly more coating color; and, in the dryer section, will hold this area away from the dryer surface. Of course, the wet spot will pick out or crush when going through the machine calender.

Formation streaks on the fourdrinier wire will pick up the coating differently than the areas adjacent to them, thus resulting in a magnification of the defect. Because of the concentration of clay at the sheet surfaces, it is necessary to maintain very even moisture across the sheet, as well as from reel to reel. The requirement is essential in order to obtain any degree of uniformity of finish and to prevent "blacking." It is doubly true if the sheet is to be super-calendered, which much of it is.

Continuous moisture-recording instruments are very desirable as part of the process equipment. However, with reasonably good "papermaking," the advantages of the process combine to make an unusual and unique product. It is a product that is particularly suited to the trend of the times of the publication field, namely: a trend toward lighter weight papers of high printing quality.

Economics of Process

Ultimate profit is the motive behind the vision of management, the cost of research and development, and the capital outlay to put a new product on

the market. This process must also stand the same test. Otherwise, it would be of no practical interest to managers or superintendents how think in terms of operating profit.

A recent run on a 40 lb. basis weight sheet, made on a 135 in. machine running 660 ft. per min., may be taken as an illustration. The furnish was a typical catalogue or rotogravure sheet of approximately 50 per cent sulphite and 50 per cent groundwood, with alum, little size, and 5 per cent filler added at the beater. The cost of the furnish was approximately 5c per lb. on the machine. The coating color was a clay starch mix, using 10 per cent starch on the weight of clay for the dancy coater, and 8 per cent starch on the weight of clay on the press coater. The cost of the coating color was approximately 3c per lb. at the coaters.

The amount of coating applied was 8½ lb. total both sides, or 21 per cent of the total weight of the coated sheet. The difference between coating applied and furnished indicated a retention of 66 per cent. The replacing of 21 per cent of a 5c furnish with 3c coating (corrected to roughly 4½c on an overall retention basis) makes a saving of $3.20 per ton. It also upgrades the product in brightness and printability.

The market potentiol for lightweight coated grades, described earlier, is measured in many thousands of tons annually. Therefore, since the production of greater printing area per pound of fiber is fundamental in the conservation of our resources, it is a lucrative field.

Conclusion

As yet, I have not heard of anyone clay coating a sheet of tissue paper on the paper machine for printing purposes. However, if a market exists and money can be made in the process, the free enterprise system we have known in the past, and hope to know in the future, will set the manager to dreaming, the researcher to studying and trying, and the development engineer to sweating out a way to do it.

The process which has been described is another tool of the papermaker derived from a new combination of elements for the production of a better paper product.

I am proud to have had a part in the commercial development of lightweight clay coated papers. These papers are beginning to have an important place today in the economics of paper production and usage. I believe that they will have a great place in the economics of tomorrow.

The Mill Superintendent In The Present Emergency*

D. C. EVEREST[1]

I am mighty pleased to have this opportunity to again speak to the members of your association. It has been my pleasure to talk at a number of your meetings over the past thirty years and on numerous occasions have repeated what I said in 1929. As many of you were not present at these meetings, I feel that I may use this quotation at this time as it is just as applicable today as it was when I said it 21 years ago. At that time I said: "Little did we think, ten years ago, that the small group of men who then formed the Superintendents' Assn., under the able leadership of Fred C. Boyce, would be able to perfect an organization such as this covering the entire United States. I am frank to say that Mr. Boyce and his fellow workers who laid the foundation of this association had a far better vision of the possibilities of such an organization than did many of those connected with the management of the several mills.

"Many men had the idea that this was to be another mutual admiration society with its principal object the opportunity for a great get-together and social festivities. I believe that this idea has been dispelled and even the most hardened opponents of the association's activities now recognize the sincere earnest efforts of the membership in making this one of the most effective industrial organizations in existence. You are to be commended for the wonderful growth of your association and for the good things it has done and is continuing to do for the benefit of its members and industry generally.

"You have, through your acquaintanceship and good fellowship, done more to break down the old tradition of secrecy, jealousy and suspicion which existed for many years in this industry than any other agency. You all remember when plants were closed to competitors' employes; when the information given one superintendent by another was mostly misinformation; when criticism and sarcastic remarks about the fellow in the next mill were the order of the day; when representatives of the manufacturers of paper making supplies were the ones who spread the news of an improvement here or a failure there, coupled with all the gossip which rolled easily from the tongue and lost little in the telling. All this is done away with. Men now discuss their problems in a frank, open way. These meetings, with well defined programs taking up subjects which bring out the thought of the best posted men in each of the several lines of work have done more to work out the practical problems of paper making than any other thing."

During the past 21 years your organization has grown to far greater proportions than anyone visualized. It has extended and improved its service to its membership and to the industry in general. I do not know of any organization in the operating end of any industry which is comparable with yours. You have, through your mutual acquaintanceship, done more to break down barriers of secrecy and suspicion than any operating group I know of, and all this has resulted in inestimable benefits to the membership and to the industry as a whole.

There are still some people in management who seem to oppose their supervisory force becoming members of your Association. This, in my opinion, is a short-sighted attitude and only results in loss to themselves. With the advances in education and technical ability made during the last thirty years, no concern has a corner on brains. Their failure to support an organization such as your merely deprives them of knowing at an early date of the improvements and advances made by others.

In one of my talks made some time ago, I mentioned the coming of the "personnel director" and all it might entail as far as a superintendent was concerned. The establishment of a personnel department in nearly every mill has come about even faster than I anticipated. It is a valuable adjunct to any business and so far as time is concerned, a boon to the superintendent. As I see it now, after a number of years of experience with such departmentalization, there is only one thing I think has been lost to the superin-

* Delivered at Meeting of the Northwestern Division of the American Pulp and Paper Mill Superintendents' Assn., Inc., at the Schroeder Hotel, Milwaukee, Wis., September 16, 1950.

[1] Chairman of the Board, Marathon Corp., Rothschild, Wis.

tendent. He has lost the close personal contact with the men he formerly engaged to work with him. They are now provided for him. Of course, with the rapid growth in the numbers of people employed in the industry, it was inevitable that this would have come about, as it would only be through superhuman effort that a superintendent could possibly interview and hire everyone required and still have time to do the planning and administration of the work incident to his job. I regret, however, that in most places we have lost this personal contact so highly desirable in any organization. Some of you may have found a way to lick this proposition and, if so, I think it would be well for those members to impart this information to others.

In the past I have dwelt on "foresightedness" and the necessity for every superintendent to make the greatest use of technical brains and engineering skill in every one of the various phases of his work. I do not believe it necessary to again remind anyone of that as you have done a wonderful job in utilizing all available sources of skill and technique in your work with the result that the production of the mills you operate has kept pace with the terrific demand for pulp, paper and paperboard brought about through the development of new products and the great increase in population. This is no mean accomplishment on your part.

When the Superintendents' Assn. was founded, the consumption of paper and paperboard, including the importations of newsprint and other papers, amounted to 6.3 million tons or a per capita consumption of 119 pounds per year. Within 31 years this has jumped to about 27 million tons or about 350 pounds per person, based on my own estimate for 1950. This means that over four times as much paper and paperboard is being used this year than was used in 1919. Individuals are using about three times as much per year as in 1919 and there are 46 million more people using paper in this country than there were then.

I do not believe that any other basic industry can show anywhere near the increase in consumption of its products as the paper industry. While I do not anticipate that the consumption of paper and paperboard will continue to increase over the next thirty years at the percentage rate it did in the past thirty years, yet I can see a constantly increasing growth at a satisfactory rate for an indefinite period. Management must not get the idea that there will not be times when demand may fall off a bit, but the trend will be upward if it is surveyed on a longer period than a "month to month" or "quarter to quarter" basis. So long as population increases, consumption of paper will increase.

I know of no industry which has a better record of continuity of operations which means employment of people than the paper industry.

We have only scratched the surface in the use of paper and paperboard in a multitude of uses which have been developed in the last ten years. The consumption in the field of printing and publishing will continue as more people take advantage of additional educational facilities. My only concern is in supplying raw materials in the form of woodpulp and waste papers to keep up with demand for paper and paperboard. Right here I would like to comment further on my prediction of a consumption of 27 million tons of paper and paperboard during 1950. That figure is entirely dependent on our physical ability to supply pulp and other raw materials. The production of these items may be affected by strikes, lack of transportation, manpower shortages, war efforts or toher things beyond our control. The demand will be with us and it all hinges on our ability to secure raw materials and maintenance supplies to physically produce such tonnage. All of these comments deal with the situation without the injection of a war effort.

I had expected by this time to give you my interpretation of how the developments incident to the Korean situation might affect the paper industry. Since there has been no definite clarification by the Government as to just what controls will be put in effect or just when they will be put in operation, I am only able to give you my personal impressions based on my experience on committees in three separate war efforts. I regret to say that in my opinion we have as yet received only fragmentary and purely preliminary information as to requirements, both in men and material, for the present emergency.

No one can compare the situation as it existed in 1940 with that of 1950. In 1940 our military forces were pretty much at home and we had allies who were in position to offer some effective defense until we could mobilize our forces and train men for the gigantic task ahead. We had time to effectively organize industry to provide the requirements of the armed forces. Then, as now, we were told to provide for armed forces of varying numbers of men starting with what developed to be a surprisingly low figure and progressing rapidly until it involved approximately 14 million men and women, and with an increased demand on industry for all the supplies of war in proportion to the terrific numbers of people involved. Industry did a job despite what some people said then and have said since that time.

For some unaccountable reason, it seems to be the policy of the administration to give out information as to requirements in allopathic doses. I do not believe this is the type of information the American public likes. Due to time element, the Administration is compelled to change its estimates of requirements every week. This constant revision of estimates forces the public to wonder whether those in control have the knowledge of requirements or whether they think this bitter medicine must be given us in small doses. I think the public prefers to know the full requirements so they may plan on how to furnish those things for which they are obligated, whether it be men or materials. No one can successfully handle a war effort without careful planning any more than you or I can operate our plants without a lot of forward-thinking. With these constant changes in the administration announcements in the press, one begins to wonder if those in Government have a well defined policy or whether they are going along on a "catch as catch can" basis. My personal opinion is they have a policy which involves controls far beyond anything we have previously experienced but, for either political or security reasons, they do not deem it wise to disclose such policy at this time.

I previously referred to a comparison of the situation in 1940 with 1950. Today the majority of our armed forces are not at home. They are scattered all over the globe trying to maintain a semblance of being a protective influence looking after the rights of many countries who desire freedom as against serfdom. Our allies, who can be of much assistance in any war, are woefully lacking. The whole job seems to devolve on the English speaking nations and some of those are not in the position they were in 1940 to provide a delaying action for us or to help with men and materials as they were then.

I think we might as well acknowledge that we are in the worst mess and the tightest spot we have ever been in, and that getting out of it is our business and that we will not get much assistance from other sources. We will suffer from the cumulative effect of past bungling. In our business we have all learned there is no use "crying over spilt milk." There is nothing to do now but face the conditions and pray to God that there will be no more need for public apologies and that there will be a minimum amount of blundering in the future prosecution of the war effort.

When it comes to controls, you might as well make up your mind that these will affect every activity in your business. We are not playing with peanuts; we are up to our neck in a fight to preserve our physical and economic life. Like it or not, we have been maneuvered into a situation from which we cannot withdraw. We will have to make sacrifices so far as our personal liberties are concerned far beyond those of the 1941-45 period. The next few years will call for the greatest use of intelligence and physical strength any of us have ever been called upon to exercise. Just how long this may continue no one on earth can predict.

To anyone who studies the situation, it is plainly evident that the manpower

shortage will be by far the most difficult factor in the whole situation. Nothing short of a miracle will provide sufficient technological development to offset the deficiency in manpower. You have a situation now which hits manpower harder than any other factor. On the one hand you will have the armed forces taking the young men and women, thus decreasing available manpower and you will have to provide the things necessary for their use in their new jobs with the armed forces. This means their requirements of goods will be much larger than when they were in civilian life. We also have fewer unemployed than in 1940. On the other hand, you will be required to do your part of the war effort with a much less efficient force of manpower consisting of the young and inexperienced and the physical rejects from the armed forces plus an increasing number of older people. You have some headaches in store for you as well as has every other superintendent in every other industry. How well you and your personal department handles this situation will determine the success of your part of the war effort. Safety records will undoubtedly be wrecked through the use of inexperienced help.

Transportation of both inbound raw materials and outbound finished products, as well as the local transportation of your workers, will constitute another headache.

There is found to be a shortage of raw materials as the paper industry is so dependent on the chemical industry which, in turn, is so closely related to everything which has to do with the war effort. We cannot expect to get our regular supply of chlorine and caustic unless we are making some product which, through Government specifications, requires the full use of these chemicals. While there is no question as to the essentiality of paper and paperboard in the prosecution of any war, yet the success of your efforts in fulfilling your company's obligations will depend on your versatility and your cleverness in the substitution of the raw materials available for those you have been accustomed to use. You will have plenty of opportunities to use all of the technical brains you have available in your plants when it comes to doing this job.

The main difficulty will be a shortage of our primary raw materials, wood, waste papers, and rags. This will come about through manpower shortage and if history repeats itself it will be due to the lack of foresightedness on the part of the producers of wood and the collectors of waste materials in not maintaining wage rates which will enable them to hold their available labor in competition with other industries. In all thes controls, for political reasons, the shifting of labor forces from one industry to another will not be done until the situation becomes so desperate that there is no other way in which to win the war. Due to the political implications, I doubt if this action will ever be taken until it is too late; therefore, we must find some way to hold the people who are skilled in getting out wood and collecting and assorting waste materials which also includes metals so vital to winning a war.

There are countless other difficulties which will bob up to plague you in your work of operating plants producing such essential products as paper and paperboard. While some people may pooh-pooh this suggestion, it will be well for you and your personnel departments to know your labor force and whom you are hiring as replacements. If our enemies are suffering through our efforts, it is not inconceivable that we may be faced with a wave of sabotage. There is no other thing so effectual as putting a vital plant out of production during a war and all such plants are vulnerable.

The President has warned that industry cannot expect to do "business as usual." Such warning is entirely unnecessary. Any person connected with industry who has lived through three of these performances, or even one, knows far better than those in government that "doing business as usual" is impossible. Anyone with any common sense knows that the sooner he gets busy and contributes his share in any war effort the quicker the war will be over and every industrialist lives in hope that some day he may return to some semblance of "doing business as usual," although at present that time seems far off.

I realize that I have not painted a very glowing picture for the immediate future, but I think it much better for us to be aware of the difficulties we will probably encounter and plan to overcome them in the best way possible. Increasing inventories is not an answer. With controls as planned, this will afford only a temporary advantage and controls will catch up with hoarders sooner than they anticipate and may really prove a boomerang.

There is just one more thing I can think of which must be kept uppermost in the minds of all industrialists. They must take their share of war business regardless of the effect it may have on their regular business. With the controls now in the hands of the President, non-cooperation in furnishing military requirements can immediately deprive one of operating supplies and maintenance materials.

I have only touched on the more important parts of the program. You all know the natural sequence of events in such situations. They involve allocations, rationing, price controls, and all the other things necessary to make a unified business of all of the production of goods within the United States.

You men in this association have shown your ability to cope with difficulties in the past and despite the gloomy outlook which confronts us, I am confident you will again demonstrate your ability to meet the difficult tasks assigned you.

We are particularly fortunate, through the farsightedness of many of you here today, in having a nation-wide organization which will cooperate to the fullest in helping to extricate the country from one of the most trying situations it has ever been in. I have implicit faith in your ability to do the job.

AUSTRALIAN NOTES

It is reported by Australian Newsprint Mills Ltd. that the erection of the three-roll Dominion paper machine with vapor removal system, headbox, Bird screens, etc., at the Boyer works, Tasmania, is nearing completion and should be ready for operation within a few weeks. But because of delays in deliveries of steel and some needed equipment for the screen room, beater room and new wood mill, it will be several months before the management will be able to bring all machines into production.

* * * *

The demand for paper and cardboard in Australia has been increasing steadily for many years, but in the year 1948-49 the total consumption of paper for all purposes was 109 pounds per head in Australia whereas it was 358 pounds per head in the United States. In the course of the market surveys which have been under continual review since the latter part of the war, it has been evident that vast opportunities for further expansion of the use of paper and cardboard packaging materials lie before us if Australia is to approach the usage existing in America.

* * * *

Developments at the Ballarat Paper Mills Pty. Ltd. mill at Ballarat (Victoria) have proceeded so satisfactorily, it is reported, that a trial run of the smallest of the company's four coated-art paper machines was recently made. Six English papercoating technicians reached this country recently to form the nucleus of the staff and to train local operatives.

* * * *

New Zealand Forest Products Ltd. has accepted a tender for the erection of three large buildings at Kinleath, comprising about half those required for the pulp mill. Total cost of the pulp mill buildings and plant, which is scheduled to commence production early in 1952, is likely to be over £1½ million, while approximately £750,000 will be absorbed in establishnig the kraft paper mill alongside, which is due to start operating in 1953. The company earned a record profit of £107,552 during the year, an increase of £32,391 over the figure for the previous 12 months.

Patent Abstracts

● ***In addition to abstracts on the technology of pulp, paper and related industries, miscellaneous abstracts which may provide useful information are included.***

United States

U.S. 2,527,073 — Bag Closure. Richard Arthur Port, Decatur, Ga., assignor, by mesne assignments, to International Paper Company, New York, N. Y. Filed June 3, 1947 — Issued October 24, 1950.

A sealing means for the closure of a gusseted notched corner multiwall paper bag wherein is provided a line of stitching securing the opposing walls of the open end of the bag and disposed in a plane above that of the horizontal shoulder of the notch, comprising a sealing strip medially folded and adhesively secured to the exterior surface of each wall of the bag and overlying the stitching, said strip being provided with a line of perforations disposed along said medial fold line in at least the area of said notched corner whereby the notched corner of said bag can be opened for filling purposes by tearing along said line of perforations.

U.S. 2,527,074 — Bag Closure. Richard Arthur Port, Decatur, Ga., assignor, by mesne assignments, to International Paper Company, New York, N. Y. Filed October 15, 1947 — Issued October 24, 1950.

A closure for the open end of a multiwall paper bag which includes a notched corner having a substantially horizontal shoulder portion inset from the bag end and an upwardly extending portion extending between the bag end and said shoulder portion, comprising a line of stitching securing the opposing walls of the open end of the bag and disposed in a plane above that of the said horizontal shoulder portion of the notch, said line of stitching terminating in a free end extending beyond said upwardly extending notch portion a distance at least equal to the length of said horizontal shoulder portion, and a sealing strip medially folded and adhesively secured to the exterior surface of each wall of the bag end and overlying the stitching and said notched corner portion, said strip being provided with a line of weakened areas in at least the area of said notched corner portion whereby the notched corner of said bag can be opened for filling purposes by grasping the freely extending portion of said stitching adjacent the area of said notched corner and ripping said strip along said weakened line.

U.S. 2,527,167 — Carton. George E. Wauda, Neenah, Wis., assignor to Marathon Corporation, Rothschild, Wis. Filed October 15, 1947 — Issued October 24, 1950.

A collapsible carton formed from a single blank suitably cut, scored and glued to provide a foldable tray having front, rear and side walls, a foldable cover hinged to said rear wall, said front wall having an externally folded locking flap hinged at the upper edge thereof, said cover comprising a top wall, side walls and a front wall, said cover side walls each having a flap extension said flap extensions each being cut to provide reentrant recesses in said flap extensions facing the top wall of said cover and having a cut edge opposed to the longitudinal edge of said locking flap, said flap extensions being overlapped and adhered by an adhesive area to inner portions of said cover front wall, said adhesive being spaced inwardly from said cut edge whereby pocket portions are provided in conjunction with the unadhered underlying cover front wall for receiving portions of said locking flap to thereby retain said cover in releasably locked condition.

U.S. 2,527,295—Apparatus for Manufacturing Valve Bags. Daniel Belcher, Minneapolis, Minn., Russell J. Williams, Richmond Heights, Mo., and James E. Voege, Alton, Ill., assignors to Bemis Bro. Bag Company, St. Louis, Mo. Filed June 25, 1947 — Issued October 24, 1950.

Apparatus for manufacturing gusset-side valve bags, comprising a rotatable carriage, a plurality of bag spreaders mounted on the carriage for movement therewith in a horizontal circular path, each of said bag spreaders being adapted to spread the gusset sides of a bag body horizontally flat, a single means for delivering a valve sleeve upon the mouth end of the upper gusset side of a spread bag body carried on any one of said bag spreaders as it travels through a first arc of said path, a single means for affixing the sleeves to the upper gusset sides of the respective bag bodies as they travel through a second successive arc of said path, means for collapsing said bag spreaders as they travel through a third successive arc of said path to permit the gusset sides of the bag bodies to refold, a nozzle positioned to direct a blast of air downward upon the sleeves as the bag spreaders travel through said third arc, means including a valve for supplying air under pressure to said nozzle, and means operable in timed relation to the rotation of the carriage for opening said valve as a sleeve travels under the nozzle.

U. S. *2,527,563—Method of Bleaching Semichemical Pulps.* Robert L. McEwen, Williamsville, N. Y., assignor to Buffalo Electro-Chemical Company, Inc., Tonawanda, N. Y. Filed August 13, 1947—Issued October 31, 1950.

The method of bleaching a semi-chemical pulp containing from about 7% to 17% lignin which comprises treating the pulp in an aqueous environment containing 0.25% to 1.0% active chlorine based on the weight of dry pulp and at a pH in the range pH 3.5 to 9.0 and thereafter bleaching the pulp with alkaline peroxide.

U. S. *2,527,620 — Paper Trimming* Device. Steven L. Calgary, New York, N. Y. Filed April 19, 1947—Issued October 31, 1950.

A sheet paper trimming device, comprising an inclined plate pivoted at its bottom and adapted to receive a paper sheet placed thereon in a shiftable, adjustable manner, a stationary cutting knife arranged along its upper edge, said edge being closely slidable along said knife when the plate is rocked at its bottom pivot, a yielding resilient member tending to keep said plate in said inclined position, a second knife underneath and closely along the plane of a side edge of said plate, an angular bar having portions spaced over said plate along its two cutting edges and over their meeting corner, and a loop device secured on the underside of said plate at said corner, its upper end adjustably holding the corner of said angular bar.

U. S. *2,527,628—Process for Producing a Matrix Containing Particulate Fillers.* Carleton S. Francis, Jr., West Harwich, Mass., assignor to American Viscose Corporation, Wilmington, Del. Filed September 16, 1944—Issued October 31, 1950.

A method of producing a felt-like compacted abrasive device which comprises blowing abrasive particles, discontinuous potentially adhesive fibers, and discontinuous non-adhesive fibers together in a confined space, collecting the mixed particles and fibers, and molding the product at the softening temperature for the potentially adhesive fibers, to produce a product in which the fibers are autogeneously bonded together at their points of crossing, and each filler particle throughout the product is partially imbedded in and held by the potentially adhesive fibers, the portion of each filler particle not imbedded in said fibers having a free, uncoated surface.

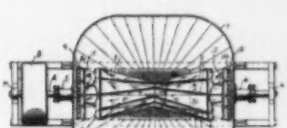
U. S. *2,527,701 — Cellular Carton.* Kenneth T. Buttery, Kalamazoo, Mich., assignor to Sutherland Paper Company, Kalamazoo, Mich. Filed August 2, 1946—Issued October 31, 1950.

A collapsible cellular carton formed of a single blank cut and scored to provide hingedly connected bottom, side and end walls, the bottom comprising bottom members disposed at the ends of the blank and overlapped and secured together, the side walls being hingedly connected in the blank to the inner edges of the *bottom* members, the end walls being in the blank between the inner edges of the side walls. . . .

U. S. *2,527,702 — Cellular Carton.* Kenneth T. Buttery, Kalamazoo, Mich., assignor to Sutherland Paper Company, Kalamazoo, Mich. Filed August 22, 1946—Issued October 31, 1950.

A collapsible cellular carton formed of a single blank cut and scored to provide hingedly connected bottom, side, and end walls, and longitudinal and transverse partition members, the bottom comprising bottom members one of which is disposed at one end of the blank, the longitudinal partition member being at the other end of the blank, the other bottom member being hingedly connected to the longitudinal partition member, the side walls being hingedly connected in the blank to the inner edges of the bottom members, the bottom members being overlapped and secured together with the longitudinal partition member above the bottom and hingedly connected thereto centrally thereof. . . .

U. S. *2,527,772 — Pulping Machine.* Stephen G. Stapley, Thorold, and William Subart, Merritton, Ontario, Canada, assignors to E. D. Jones & Sons Company, Pittsfield, Mass. Filed May 6, 1947—Issued October 31, 1950.

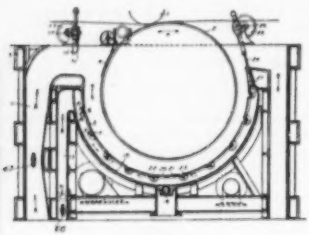


A pulping machine comprising in combination, a tank having adjacent and opposite end and side walls, a shaft extending from one side wall to the other side wall of said tank and journalled in said side walls for rotation, a drum and said tank fixed on said shaft and being in the form of two elongated tubular frusto-conical sections having inner adjacent small ends intermediate opposite ends of said drum and imperforate side walls relatively diverging therefrom to relatively large outer ends and imperforate end walls se-

U. S. 2,527,793 — Hot Melt Coating Compositions. Charles K. Bump, Hampden, and George H. Bischoff, Fort Devens, Mass., assignors to Monsanto Chemical Company, St. Louis, Mo. Filed February 28, 1948 — Issued October 31, 1950.

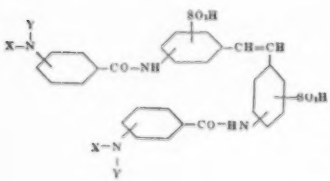
A hot melt composition comprising 100 parts of a polyvinyl acetal resin, from 150-800 parts of hydrogenated castor oil and from 1-15 parts of a fluid dialkyl silicone polymer.

U. S. *2,528,189 — Apparatus for the Manufacture of Paper.* John Temperley, Bury, England, assignor to Walmsleys (Bury) Limited, Bury, England. Filed November 27, 1945—Issued October 31, 1950.



A paper making machine comprising a vat, a hollow drum having a reticulate surface rotatably mounted in said vat, a main stock inlet for said vat located adjacent one side thereof and spaced transversely of the axis of rotation of said drum, an overflow outlet located adjacent the side of said vat opposite said main stock inlet, said vat having a wall spaced from the bottom thereof and from said drum defining a pair of passages concentric with said drum and extending along substantially the entire submerged surface of said drum, one of said passages connecting said main stock inlet and said overflow outlet and extending immediately adjacent said drum, said wall having a plurality of openings therein and valves controlling each of said openings, an independent, separate subsidiary stock inlet adjacent one side of said vat and spaced laterally of the axis of rotation of said drum, the other of said pair of passages connecting said subsidiary stock inlet with said one of said passages throughout substantially the entire length thereof through each of said openings.

U. S. *2,528,324—Method of Treating Paper and the Resulting Products.* Richard Thomas, Bromborough, England, assignor to Lever Brothers Company. Filed April 10, 1946 — Issued October 31, 1950.



A process which comprises applying to paper an amount in the range from 0.0001% to about 0.025%, based on the dry weight of the paper, of an aminoaroylaminostilbene sulfonic acid which is free from color producing groups and which has the following general formula:

in which X is a radical selected from the group consisting of aroyl and acyl radicals, and Y is a radical selected from the group consisting of hydrogen, alkyl and aryl radicals, by treatment with an aqueous solution of said acid, said amount of said compound being sufficient to impart a whitening effect to the paper which does not discolor upon exposure to light, air and bleaching agents.

U. S. *2,528,349—Alkaline Sulfite Digestion of Hardwood.* Eduard Farber, Washington, D. C., assignor, by mesne assignments, to Hardwood By-Products, Inc. Filed February 27, 1945—Issued October 31, 1950.

A process for extracting hemicelluloses, lignin, pentosans and similar bonding agents from hardwood to produce a pulp which consists essentially of subjecting at atmospheric pressure and at a temperature of about 40° C. hardwood particles to the action of an aqueous solution consisting essentially of about 0.5% by weight of both an alkali metal hydroxide and an alkali metal sulfite.

U. S. *2,528,350—Two-Step Digestion of Hardwoods.* Eduard Farber, Washington, D. C., assignor, by mesne assignments, to Hardwood By-Products, Inc. Filed June 5, 1947—Issued October 31, 1950.

A process of preparing for subsequent fiberizing treatment particles of hardwoods having a hemicellulose content of at least 18% which comprises essentially digesting said particles for a period of from about 1 to about 2 hours at a temperature from about 15° C. to about 30° C. with a dilute aqueous solution containing essentially about 0.4% to about 2.5% by weight of an alkali metal sulfite, and then digesting for a period of from about 1 to about 2 hours, said particles at a temperature of from about 70° C. to about 80° C. with an aqueous solution containing essentially from about 1% to about 4% of an alkali metal hydroxide, the entire process being carried out at atmospheric pressure.

U. S. *2,528,351—Alkaline Sulfite Digestion of Hardwood.* Eduard Farber, Washington, D. C., assignor, by mesne assignments, to Hardwood By-Products, Inc., Asheville, N. C. Filed August 17, 1950—Issued October 31, 1950.

A process of preparing for subsequent fiberizing treatment particles of hardwoods having a hemicellulose content of at least 18% which comprises essentially digesting said particles at atmospheric pressure for a period of from about one to about two hours at a temperature of from about 55° C. to about 75° C. with a dilute aqueous solution containing essentially from about 1% to about 4% by weight of an alkali metal hydroxide and from about 0.4% to about 2.5% of an alkali metal sulfite.

U. S. *2,528,419—Bag Valve.* Edwin E. Burroughs, Brooklyn, N. Y., assignor to St. Regis Paper Company, New York, N. Y. Filed July 30, 1948—Issued October 31, 1950.

A bag formed of thin sheet material, comprising a normally flattened tubular body portion with a corner turned in to form a valve, and having a supplemental sheet extending inward from said inturned corner to form a flexible valve extension flap, said sheet being normally folded along a crease line which constitutes the lower edge of the valve flap when the bag is empty, the sheet being slit substantially along the line of such crease from the inner edge of the extension back for a substantial distance toward the outside of the valve, the slit then veering off for a short distance to one side of the line of such crease, said flexible extension flap at said side of said slit being also formed with a crease line extending generally parallel to the main portion of said slit and spaced a short distance therefrom, whereby such side of the extension flap along its lower edge is deflected from the plane of the adjacent part of the flap and whereby when the extension flap portions are flattened toward the top of the bag upon filling of the bag, the edges of the material along the opposite sides of said slit will slide into overlapping relation.

ADVISE FOREST ECONOMY

RICHMOND, Va. — A warning that much of Virginia's pine timber is being cut faster than it is growing came this week-end from the forestry committees of the Advisory Council on the Virginia economy.

In a 42-page report to the council, the committee also recommended legislative action against forest fires — including passage of laws to prevent "the discarding of burning matches or tobacco from moving vehicles."

The committee reported the wood industry employs 23 percent of all manufacturing workers in Virginia. Value of the industry in this state was "conservatively estimated at $800 million."

By adoption of a coordinated program of modern forest practices, carried out primarily by private enterprise in cooperation with government agencies, Virginia's raw wood production can be doubled, and its income materially increased, the report added.

About nine-tenths of Virginia's forest are privately owned, of which more than half are in farm ownership, according to figures set forth in the report. About 2,700 separate industrial plants, ranging from small sawmills to large pulp processing plants, are engaged in handling products of Virginia forest lands.

Committee recommendations include the destruction of the "worthless hardwoods" in some areas of Eastern Virginia, to make way for reforestation of more valuable pine, reforestation of abandoned land, and extensive reseeding programs in pine-cutting areas. The Virginia Advisory Legislative Council, says the committee, "should make a detailed study of the advisability of enacting legislation granting tax deferment or exemption as a means of stimulating reforestation of idle and abandoned land.

Heavy emphasis in the report is placed on the need for expanded public education in the forest field, particularly in teaching the basis modern forest premise—that timber should be grown as a crop. Excellent initial progress has been made, the committee states, and hundreds of thousands of acres of Virginia forest land already are being treated the way the committee advocates for the State as a whole.

Although Virginia's timber harvesting is extensive, still it is necessary to import 93 million board feet of lumber annually to feed Virginia's wood-processing plants. "Too much money is leaving the state for freight and processing on forest products which should be grown at home," the report states.

SUPPLIERS

FREDERIC C. CLARK ASSOCIATES announce that after November 10 their office will be located at Manchester, Vt. While Mr. Clark will continue as consultant to several of his former clients, the greater part of his time will be devoted to a new enterprise which is unrelated to the pulp and paper industry.

HOOKER ELECTROCHEMICAL CO. will build a plant for the manufacture of anhydrous ammonia at its Tacoma, Wash., plant. The board of directors, at its recent meeting, authorized the expenditure of approximately $2 million for the plant which is expected to be in production early in 1952.

KENNEDY CAR LINER & BAG CO., INC., Shelbyville, Ind., announced on November 14 the sale of the controlling interest by Mr. and Mrs. Fred W. Kennedy to a group long associated with the firm and composed of Burton F. Swain, Jr., Hugh B. English, Harry M. Hanson, Oscar W. Fisher, L. Paul Lockman and William Reimann.

Operation of the industry under the new majority ownership will be headed by Mr. Swain as chairman of the board of directors; Mr. Hanson, president; Mr. English, first vice-president; Mr. Fisher, second vice-president; and Mr. Lockman, secretary-treasurer.

Besides Chairman Swain, the board of directors will be composed of Hanson, English, Fisher, Lockman, Reimann, Ed Raub of Indianapolis, and W. W. Peterson of Cincinnati.

MORNINGSTAR, NICOL, INC., New York starch and dextrine manufacturer, announced that John Birrell has joined the firm in a technical sales capacity. Mr. Birrell was formerly with Stein-Hall & Co.

H. K. PORTER CO., INC., Pittsburgh, Pa., announced the formation of Jarecki Valve Division, Tulsa, Okla., to handle the manufacture and sale of Jarecki Valves formerly produced at Jarecki Manufacturing Co. plant in Erie, Pa.

BUD MUELLER

LOCKPORT FELT CO. announces that "Bud" Mueller joined the company on October 23 as sales representative in Michigan, Minnesota and Wisconsin. He succeeds Tom Gillespie.

PENNSYLVANIA SALT MFG. CO. has appointed Albert H. Clem to the newly created position of assistant to the vice-president in charge of sales.

P. R. SANDWELL, consulting engineer, Vancouver, B. C., has been contracted by the Everett Pulp and Paper Co., Everett, Wash., for the engineering of expansion to its paper mill plant. Bulk of the engineering work will be handled by Sandwell and Co., Inc., Seattle, Wash.

ASSOCIATIONS

TO ADDRESS MICHIGAN SUPTS.

The Michigan Division of the Superintendents Assn. is to hold its December meeting on the evening (6:30 p.m.) of the twenty-first at Hotel Harris, Kalamazoo. The guest speaker is to be Dr. Arnold E. Schneider, professor and head, Department of Business Studies, Western Michigan College (Kalamazoo). Dr. Schneider's subject will be "The Supervisor and His Responsibilities to Man and Management."

Years of experience with business and industrial firms and as a management consultant afford Dr. Schneider a rich background upon which to draw for his material. Dr. Schneider has written and lectured extensively. His name is listed in "Leaders in American Education"; also, in "Who's Who in American Education." He is reputed to be a forceful and energetic speaker who punctuates his message with spontaneous wit and humor. Although recognized as an outstanding scholar and leader in the educational field, he is known as a no ivory-tower theorist.

OHIO TAPPI MEETING

The next meeting of the Ohio Section of TAPPI will be held at the Hotel Manchester in Middletown, O., on December 12. The Section has obtained Dr. Herman Mark, director of the Institute of Polymer Research, Brooklyn, N. Y., as speaker for the evening. He will discuss the principles of Fiber to Fiber Bonding. Dinner will be served at 6:45 p.m. and the meeting will follow at 7:45 p.m.

LET'S BUILD A BETTER AMERICA

Dr. Allen A. Stockdale, staff speaker, National Assn. of Manufacturers, New York, N. Y., is to address a joint meeting of the Michigan Division of the Superintendents Assn. and the Kalamazoo Section of TAPPI on the evening of January 18, 1951, at Hotel Harris, Kalamazoo. The subject of Dr. Stockdale's address will be "Let's Build A Better America."

Equally at home with workers, foremen, employers, housewives and students, Dr. Stockdale is one of the best informed and most dynamic spokesmen for industry in the United States today. During the past twelve years in his present connection, he has made more than 3,000 talks before hundreds of thousands of people in the forty-eight states of the United States and in Canada. He has contributed greatly toward a better understanding of the American individual enterprise system by people in every segment of the economy.

Dr. Stockdale was a luncheon speaker at the annual convention of the Superintendents Assn., held on June 15-17, 1949, at the Chalfonte-Haddon Hall Hotel in Atlantic City, N. J.

Asten-Hill Manufacturing Co. have just completed their new Philadelphia plant and have recently enlarged the plant of Asten-Hill Limited at Valleyfield, Quebec, Canada. Papermakers are cordially invited to both of the plants. The Philadelphia plant is shown at left, and the Canadian plant at right.

Financial News

Abitibi Power & Paper Co., Ltd., has declared a dividend of 75c on the common and the regular quarterly dividend of 37½c on the preferred, both payable January 1, 1951, to stockholders of record December 1. Company paid 50c quarterly on the common during 1950 and 25c quarterly during 1949.

Anglo-Newfoundland Development Co., Ltd., are calling extraordinary general meetings of the stockholders for November 27, December 4 and December 7 in order to approve a number of proposals by directors.

One proposal indicates that the directors have decided to raise the authorized capital of the company to $30 million in shares of $5 each from the present $15 million, of which $9,164,025 is at present issued, and to authorize the distribution to shareholders on the register on December 7 of two shares of $5 each for each share held, bringing the issued capital up to $27,492,075.

It is also proposed, before the issue is made, to pay a dividend of $2 per share on presently outstanding shares. In the past, the firm has paid $1 per year in one annual payment, with the last such payment having been on July 7, 1950. It is proposed that the $2 dividend will be made payable on December 20 to stockholders of record on November 27, and that the allotment of bonus shares will be made on December 22 to stockholders of record on December 7. It should not be assumed that the same rate of dividend will be paid on the increased issued capital as has recently been paid on the presently issued capital, directors point out.

American Writing Paper Corp. completed the first nine months of 1950 with a net profit of $241,694.19. This includes the third quarter operations of the corporation which showed it had a net profit of $132,690.10 after all expenses. For the third quarter period of last year the net profit was only $6,133.62.

Brompton Pulp and Paper Co., for nine months to September 30, reports net income (Canadian currency) $1,517,444, compared with $607,335 last year. September quarter: Net income $602,354, compared with $209,810 a year ago.

Champion Paper & Fibre Co. has declared a dividend of 75 cents a common share payable December 1. The company paid 60 cents each in the two previous quarters prior to which 50 cents a share was distributed.

Donnacona Paper Co., Ltd., has advised the Montreal Stock Exchange that the company's outstanding 4½ percent preferred stock will be redeemed on or before December 15 at call price of 105 and accrued dividends. There are presently 25,000 shares of the $100 par 4½ cumulative convertible redeemable preferred outstanding.

Robert Gair Co., Inc., has announced a quarterly dividend of 10 cents for the fourth quarter of the year 1950, and a year-end dividend of 60 cents payable on common stock December 20, to stockholders of record at the close of business December 1. Dividend on preferred stock for the entire year has been declared and a dividend of 30 cents for the fourth quarter will be paid on the same schedule as the common stock dividend.

Hammermill Paper Co. and subsidiaries report for quarter ended September 30 as follows:

	1950	1949
*Earned per common share	$1.56	$.39
Net sales	5,726,564	4,271,637
Net income after taxes	597,532	180,682
No. common shares	360,000	360,000

Nine months ended September 30:

	1950	1949
*Earned per common share	$3.50	$1.10
Net sales	17,389,682	13,514,625
Net income after taxes	1,370,081	514,774

* After preferred dividend requirements.

Minnesota and Ontario Paper Co. reported net sales of $37,161,562 for the first nine months of 1950. Sales during the same period of 1949 totaled $32,387,338. Net profits this year totaled $3,607,717, equivalent to $2.80 per share, compared with last year's $2,449,366 or $1.90.

Gaylord Container Corp. summary of operating results for nine months ended September 30, 1950 and 1949:

	Nine Months Ended Sept. 30, '50	Nine Months Ended Sept. 30, '49
Income before depreciation, depletion, interest, and taxes on income	$7,403,913.18	$5,392,430.25
Deduct:		
Depreciation and depletion	926,627.05	846,949.71
Interest charges	172,306.19	67,356.02
Federal and state taxes on income—estimated	2,547,300.00	1,721,200.00
	$3,646,233.24	$2,635,505.73
Income After All Charges	$3,757,679.94	$2,756,924.52
Earnings per share of common stock — 2,338,317 shares outstanding	$1.61*	$1.18

* Federal taxes on income for 1950 are at the rates specified by the Revenue Act of 1950.

Hollingsworth & Whitney Co., paper manufacturers, have declared a dividend of 62½ cents per share on the common stock, payable December 12, to stockholders of record at the close of business November 24. A dividend of the same amount per share was paid on December 12 of last year. A regular quarterly dividend of $1 per share on the $4 cumulative preferred stock, payable December 30 to stockholders of record at the close of business December 15, has also been declared.

National Container Corp. reports for the quarter ended September 30, 1950, sales of $11,800,000 against $7,970,000 in the like 1949 period. Samuel Kipnis, president, estimated that fourth-quarter 1950 sales will exceed $14 million.

KEYES FIBRE COMPANY
COMPARATIVE STATEMENT OF EARNINGS

	Three Months Ended September 30, 1950		Three Months Ended September 30, 1949	
Gross Sales Less Discounts, Returns and Allowances		$2,558,743		$2,002,048
Cost of Goods Sold		1,389,551		1,204,103
Gross Profit		$1,169,192		$ 797,945
Selling, General and Development Expenses		293,029		248,054
Profit before Other Income		$ 876,163		$ 549,891
Other Income		104,111		27,029
		$ 980,274		$ 576,920
Miscellaneous Deductions		3,450		3,375
Balance		$ 976,824		$ 573,545
Depreciation and Amortization	$72,840		$72,863	
Provision for Federal Taxes on Income	399,103	471,943	180,386	253,249
Balance before Interest and Bond Expense and Income		$ 504,881		$ 320,296
Interest on Notes, Etc.			$ 7,678	
Interest on Bonds	$18,120		19,819	
Bond Premium Income (Less Bond Expense)	(1,032)	17,088	(1,515)	25,982
Net Profit		$ 487,793		$ 294,314

Maclaren Power & Paper Co. has declared an extra dividend of $1 and the usual quarterly dividend of 50 cents, both payable November 30 to stockholders of record November 4.

Masonite Corp. directors recommended a split on a two to one basis of the company's 675,276 shares of common. The proposal will be submitted to stockholders for approval at a special meeting December 6. The directors fixed November 13 as record date for stockholders entitled to vote at the meeting. Eugene Holland, president, said the purpose of the proposal was to give recognition to the fact that the common stock equity per share has increased during recent years due to retention of earnings. Directors also declared a regular quarterly dividend of 50 cents on common payable November 30 to stockholders of record, November 13.

Merritt-Chapmann & Scott Corp. voted a quarterly dividend of 40 cents per share of common stock, plus an 80 cents per share year end extra dividend, both payable on December 1 to stockholders of record November 15. This marks a departure from the company's previous practice of making common stock dividend payments on a semi-annual basis. A regular quarterly dividend of $1.62½ per share on the company's preferred stock, payable December 1 to stockholders of record November 15.

Price Brothers & Co. has announced a four-for-one split of the company's 679,084 shares of common stock which will convert the number of shares into 2,716,336. This split was recommended previously after a meeting of the company's board of directors in September. It is expected that this split will mean certificates for outstanding shares will be recalled so that new certificates for the lower-priced stock may be issued, with the new split stock likely to be on the market before the end of the year. It is believed in trading circles that the company's stock will be more attractive now to small investors due to the lower price involved.

Howard Smith Paper Mills has indicated there is no intention on the part of the directors of this company either to split the common stock or to offer it in exchange for common shares of Donnacona Paper Co.

"It has come to my attention that certain rumors are current that common shares of Howard Smith are shortly to be split and that stockholders of Donnacona are to be offered an exchange of their shares for common shares of Howard Smith," Howard Crabtree, chairman of the board, states. "I desire to emphatically state that no consideration has been given by the directors of Howard Smith to either of these matters."

Lake St. John Power and Paper Co. reports nine months net income of $1,480,453, compared with $826,320 last year. September quarter: Net income $491,825, compared with $274,050 a year ago.

Powell River Co., Ltd., has declared a dividend of 50c, coupon 24, plus $1 extra, payable December 15 to stockholders of record November 23.

St. Lawrence Paper Mills Co., Ltd., has declared a dividend of $1.50 per share on first preferred and another dividend of 60c per share on second preferred stock, both payable January 25 to stockholders of record January 4.

St. Lawrence Corp., Ltd., has declared a dividend of 50c per share on first preferred stock and another dividend of 18¾c on second preferred stock, both payable January 25 to stockholders of record January 4.

STOCK REPORT

	Per Share Earnings		Indic.	Nov. 21
	Calendar Year 1949	12 Mo. to Approx. 9/30/50	Annual Divid. Rate	Approx. Market Price
PREFERRED STOCKS				
Armstrong Cork Co. $3.75 Cum.	$40.95*	$48.14a	$3.75	$105½
Armstrong Cork Co. $4.00 Cum Conv.	40.95*	48.14a	4.00	113¼
Celotex Corp. 5% Cum.	6.80c	8.75a	1.00	16½
Champion Paper & Fibre $4.50 Cum.	60.09f	97.79	4.50	106½
Container Corp. of Amer. 4% Cum.	89.52	122.92	4.00	104¼
Crown Zellerbach $4.20 Cum.	54.38c	61.85a	4.20	103⅞
Dixie Cup Co. $2.50 Cum. Conv. Cl. A	10.93	13.70	2.50	54½
Flintkote Co. $4 Cum.	62.70	79.70	4.00	105½
Robert Gair Co., Inc. 6% Cum.	13.79†	17.21†	1.20	18½
International Paper Co. $4 Cum.	224.55	323.40	4.00	106¼
Kimberly Clark Corp. 4% Cum.	85.27	117.03i	4.50	106¾
MacAndrews & Forbes 6% Cum.	61.59	63.03	6.00	141¼
Mead Corp. 4¼% Cum.	51.37	88.30	4.25	93½
Mead Corp. 2% Cum. Conv. 2nd	21.35*	36.20*	2.00	59
Pabco Products, Inc. 4% Cum. Conv.	56.46	124.88	4.00	100¼
Rayonier Inc. $2 Cum.	9.54	17.45	2.00	34¼
St. Regis Paper Co. 4.40% 1st A	30.74	52.38	4.40	95⅜
Scott Paper Co. $3.40 Cum.	51.15*	62.16*	3.40	99¾
Scott Paper Co. $4.00 Cum.	51.15*	62.16*	4.00	106¼
Sutherland Paper 4¼% Conv.	46.92	68.59	4.25	115
U. S. Gypsum Co. 7% Cum.	283.37	429.37	7.00	184½
United Wallpaper Inc. 4% Cum. Conv.	2.14	(d)17.15	2.00	22½
West Virginia Pulp & Paper 4½% Cum.	61.28c	61.06i	4.50	111
COMMON STOCKS				
APW Products Co.	(d)0.81	0.45	—	5⅜
American Writing Paper Corp.	.04	0.86	—	7⅛
Armstrong Cork Co.	6.57	7.84a	$3.00	49¼
Celotex Corp.	1.65c	2.20a	1.00	14¾
Certain-Teed Prods. Corp.	2.84	3.43	1.00	14⅝
Champion Paper & Fibre	5.15f	8.93	2.45	45¼
Congoleum Nairn Co.	3.04	2.70a	2.00	24½
Container Corp. of America	8.46	10.27	4.00	61
Crown-Zellerbach	6.02c	6.84a	2.00	46¼
Dixie Cup Co.	7.44	9.87	1.50	45⅝
Eastern Corp.	0.04	3.04	(b)	19½
Flintkote Co.	4.33	5.48	3.00	25⅝
Robert Gair Co., Inc.	2.11†	2.69†	0.70	10⅞
Great Northern Paper Co.	4.87	3.73	3.00	45⅜
International Paper Co.	7.12	8.65	2.50	48¼
Johns-Manville Corp.	4.83	6.38	3.50	47¼
Kimberly Clark Corp.	5.29	6.66i	1.80	44
MacAndrews & Forbes Co.	3.64	3.74	3.00	39¼
Marathon Corp.	3.29c	4.13i	1.40	34⅞
Mead Corp.	4.10	7.32	2.20	23⅛
National Container Corp.	0.95	2.00	0.75	10¼
Pabco Products, Inc.	0.85	1.95	0.60	17⅛
Rayonier, Inc.	4.75	9.73	2.50	45⅜
Ruberoid Co.	8.72	9.52	3.25	53½
St. Regis Paper Co.	0.91	1.63	0.60	10½
Scott Paper Co.	6.07	7.12	3.60	45¼
Sutherland Paper Co.	4.62	6.47	2.75	44¼
Union Bag & Paper Corp.	5.01	6.68	2.50	38¾
United Board & Carton	(d)1.61b	0.58j	—	14⅜
U. S. Gypsum Co.	13.51	17.87	10.00	113½
United Wallpaper	(d)0.01	(d)0.57	—	2⅜
West Virginia Pulp & Paper	8.58c	8.36i	5.00	67½

(a) 12 months to approximately 6/30/50
(b) Year ended 11/13/49
(c) Year ended 1/31/50
(d) Deficit
(f) 9 months to 12/31/49
(b) Declared 25c payable Sept. 1, 1950
(i) 12 months to 7/31/50
(j) 12 months to 5/31/50
(*) Earnings per combined preferred shares
(†) Includes domestic and Canadian subsidiaries and 60% equity in Southern Paperboard Corp.

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Most orders accepted, however, at price prevailing on date of shipment. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports

Rolls, contract, per ton	$100.00/110.00
Sheets	115.00/125.00

F.o.b. Mills, C.l. Frt. allowed, dock, N. Y.

Kraft— pr cwt., 40# base wgt.

Standard Wrapping Rolls	‡	$7.50/ —
No. 1 Wrapping Rolls	‡	8.25/ —
Standard Bag	‡	7.25/ —

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs or more

Wh. No. 1 Frd	$1.75 / —
Wh. No. 1 MG	1.75 / —
Wh. No. 1½	1.65 / —
Wh. No. 2	1.55 / —
Kraft Non-Tar	1.60 / —
White Non-Tar	

Toilet— per case of 100 rolls—1 M sheets

Unbleached 4½x4½	$5.90/ —
Unbleached 4½x5	6.05/ —
Bleached 4½x4½	7.10/ 8.80
Bleached 4½x5	9.10/ —
Per Case of 50 rolls—2000 sheets	
Unbleached 4½x4½	$5.90/$6.25
Bleached 4½x4½	6.95/ —
Per Case of 100 rolls—1000 sheets	
Facial, 4½x5, 2 ply	$8.95/$9.85

Paper Towels— per case of 3750

Wh. Jr. M'tif'd 9¼x9½	$5.65
Br. Sr. M'tif'd 10x12	4.00
Br. Jr. M'tif'd 9½x9¼	3.50
Br. Jr. Sgl. fold 10x10¾	3.35
Bldd. 7½x11, 24/25 rolls	‡ $6.00/7.00

Manila, per cwt.

No. 1 Jute Tag sheets*	$16.55/18.55
Reg. Jute M.F. 40-lb., sheets*	15.00/17.00
Wrapping Manila	8.75/ 10.50
Printing Manila	10.50/12.00

* Less usual allowance for rolls.

Gummed Tape— per bdl., 500 bdls. or more

90-lb. 375 ft. GSI	$6.90 / —
60-lb. 600 ft. GSI	6.90 / —
35-lb. 800 ft. GSI	7.93½/ —
35-lb. 500 ft. GSO	5.98 / —

Boards, per ton—

Filled News	‡$102.50/105.00
Plain Chip	‡ 100.00/105.00
Bldd. Mla. Lnd. Chip	‡ 130.00/135.00
White pat. coated .020	‡ 150.00/160.00
Kraft Liners 42 lb.	112.50/115.00
Kraft Corr. .009	117.50/126.00
Binders Boards	135.00/ —

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$64.55/$69.60
100% Rag	56.95/ 57.30
75% Rag	43.70/ 44.15
50% Rag	35.60/ 35.95
25% Rag	29.75/ 30.00

Ledgers	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$65.15/$66.35
100% Rag	58.20/ 58.75
75% Rag	44.95/ 46.20
50% Rag	36.95/ 37.30
25% Rag	31.00/ 31.35

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
Watermarked	$18.15/$19.05
Plain	17.10/ 17.45

Ledgers	4 Ctns.
	per cwt.
Watermarked	$19.50/$20.30
Plain	18.55/ 18.75

White Book
Conversion Coated — Case

	per cwt.
No. 1	$21.65/$21.75
No. 2	20.15/ 20.40
No. 3	19.65/ —
Machine Coated	
No. 1	$16.90/ 17.15
No. 2	14.90/ 15.15
Uncoated	
No. 1 Antique (Watermarked)	$17.15/ 18.65
Offset	16.15/ 16.90
A Grade E. F.	16.15/ —
A Grade S. C.	16.65/ 16.90
B Grade E. F.	15.40/ —
B Grade S. C.	16.15/ —

‡ Indicates a price change.

WORLD WOOD PULP MARKETS

Fourth Quarter Contract Prices, Per Short Air-Dry Ton

	Varying freight allowances U. S.	Canadian	Atlantic Ports Swedish	Finnish	Norwegian
Groundwood	$75.00/ —	$75.00/ 85.00	†$82.50/ —		
Sideruns Pulping News	75.00/ —	75.00/ 85.00			
Soda, Bleached	130.00/ —	130.00/ —			
Sulphate, Bleached	128.00/167.50	141.00/ —	*165.00/167.50		Competitive
Sulphate, Unbl'd North'n		115.00/120.00	*135.00/165.00		
Sulphate, Unbl'd South'n	125.00/160.00				
Sulphite, Blchd. (S'ftw'd)	128.00/145.00	135.00/138.00	*160.00/ —		Competitive
Sulphite, Blchd. (H'dw'd)	145.00/ —				
Sulfite, Semi-blchd.	128.00/ —				
Sulphite, Unbleached		117.00/120.00	*138.00/165.00		
Sulphite, Unbl'd (Glassine)		121.00/ —	*142.00/150.00		

* On dock. † Delivered.

WASTE PAPER MARKET

The following quotations were gathered from major dealers in each market. They are an indication of the price range in which volume tonnage was moving on the date specified. Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) ALL PRICES NOMINAL. SPOT OFFERINGS OR SPECIAL PACKINGS NOT INCLUDED.

	New York Nov. 16	Philadelphia Nov. 9	Boston Nov. 18	Chicago Nov. 20
No. 1 Mixed Paper	$25.00/ 28.00	$28.00/ 30.00	$25.00/ 27.00	$27.00/ —
Boxboard Cuts	20.00/ 28.00	28.00/ —	19.00/ 22.00	31.00/ —
Mill Wrappers	22.00/ 35.00	33.00/ —	29.00/ 35.00	29.00/ —
No. 1 News	26.00/ 31.00	30.00/ 32.00	29.00/ 31.00	32.00/ —
Over-issue News	29.00/ 36.00	38.00/ 40.00	36.00/ —	33.00/ —
Corrugated Containers	35.00/ 38.00	38.00/ 41.00	36.00/ 38.00	38.00/ —
New Corrugated Cuts	40.00/ 45.00	nominal	40.00/ 45.00	48.00/ —
Double Kraft Ld. Corr. Cuts	80.00/ 85.00	nominal	85.00/100.00	100.00/ —*
100% Kraft Corr. Cuts	110.00/120.00	nominal	110.00/125.00	120.00/ —
Used Kraft Bags	60.00/ 75.00	nominal	75.00/ —	55.00/ —
No. 1 Brown Kraft Paper	70.00/ 75.00	nominal	75.00/ —	55.00/ —
Super Resorted Br. Kraft	65.00/100.00	nominal	85.00/100.00	65.00/ —
New Br. Kraft Env. Cuts	125.00/130.00	nominal	120.00/130.00	130.00/ —
New Br. Kraft Cuts	120.00/130.00	nominal	110.00/120.00	120.00/ —
No. 1 Gdwd Shvs.	60.00/ 65.00	nominal	— / 60.00	35.00/ —
White Newsblanks	105.00/110.00	nominal	105.00/115.00	95.00/ —
No. 1 Flyleaf Shvs.	80.00/ 85.00	nominal	90.00/110.00	100.00/ —
No. 1 Soft Wht. Shvs.	160.00/170.00	nominal	150.00/160.00	150.00/ —
Super Soft Wht. Shvs.	170.00/175.00	nominal	165.00/175.00	160.00/ —
Hd. Wht. Shvs.	175.00/185.00	nominal	175.00/185.00	165.00/ —
Hd. Wht. Env. Cuts	195.00/210.00	nominal	185.00/200.00	175.00/ —
New Manila Env. Cuts	120.00/125.00	nominal	120.00/125.00	100.00/ —
Col. Tab Cards	90.00/105.00	nominal	85.00/ 95.00	80.00/ —
Manila Tab Cards	135.00/150.00	nominal	140.00/165.00	150.00/ —
No. 1 Mixed Ledger	75.00/ 85.00	nominal	85.00/ 95.00	80.00/ —
White Ledger	105.00/115.00	nominal	110.00/115.00	110.00/ —
No. 1 Book & Mag.†	35.00/ 40.00	nominal	30.00/ 40.00	30.00/ —
No. 1 Rep'd. Hvy. Books‡	50.00/ 55.00	nominal	55.00/ 60.00	50.00/ —

* Delivered. † Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood.

RAG MARKET

New Domestic Cotton Cuttings
(Prices to Dealers, F.o.b. Ship. Pt.)

ALL PRICES NOMINAL

No. 1 White Shirts	$17.00/$18.00
No. 1 Unblchd. Muslins	17.00/ 18.00
Blchd. Canton Flannels	15.00/ 16.00
No. 1 Lt. Silesias	10.00/ 11.00
No. 1 Lt. Prints	7.50/ 8.50
Wht. Bk. Blue Overalls (Blchable)	11.00/ 12.00
No. 1 Blue Overalls	5.00/ 5.25
Fancy Shirts	6.00/ 6.50
No. 1 Washables	5.00/ 5.50
Suntan Khaki Cuts	9.00/ —
Mixed Khaki Cuts	6.00/ 7.00
Corduroy Cuts	4.50/ 5.00
Cottonades	4.50/ 5.00
Blchd. Underwear Cuts	16.00/ 17.00
Unblchd. Underwear Cuts	15.00/ 16.00

Old Domestic Cotton Rags
(Prices to Dealers, F.o.b. Ship. Pt.)

ALL PRICES NOMINAL

	Per 100 lbs.
Mixed White	$4.50/$5.00
Cotton Pants & Overalls	3.75/ 4.25
Thirds and Blues, Repacked	3.50/ 3.75
No. 1 Roofing Rags	2.40/ 2.65
No. 2 Roofing Rags	2.00/ 2.25
No. 3 & 4 Roofing Rags	1.90/ 2.15
Roofing Bagging	1.90/ 2.15

New Foreign Cotton Cuttings
(Prices to Mills, F.o.b. Dock, N.Y.)

	Per 100 lbs.
New Dark Cuttings	$4.25/$4.75
New Mixed Cuttings	4.50/ 5.00
Light Silesias	7.50/ 8.00
Light Flannelettes	7.50/ 8.00
New White Cuttings	nominal
New Unbleached Cuttings	nominal

Fancy Shirt Cuttings	6.00/ 7.00
Light Prints	6.00/ 7.00
Bleachable Khaki, No. 1	5.50/ 6.00
Unbl. Khaki, No. 1	4.50/ 5.00

Old Foreign Rags

(Prices to Mills, F.o.b. Dock, N. Y.)

	Per 100 lbs.
No. 1 White Cottons	$6.50/$7.50
No. 2 White Cottons	5.50/ 6.00
No. 3 White Cottons	4.00/ 4.50
No. 4 White Cottons	3.50/ 3.75
Extra Light Prints	4.50/ 5.00
Old Light Prints	4.00/ 4.25
Med. Light Prints	3.50/ 3.75
Dutch Blue Cottons	3.75/ 4.00
Checks and Blue	3.00/ 3.50
Linsey Garments	2.75/ 3.00
Dark Cottons, European	2.25/ 2.50
Dark Cottons, Egyptian	2.15/ 2.30
Old Shopperies	2.10/ 2.25
New Shopperies	2.25/ 2.50

Bagging

(Prices to Dealers, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny	$7.00/$8.00
Domestic Gunny, No. 1	7.00/ 8.00
Heavy Wool Tares	6.75/ 7.50
Foreign Manila Rope	4.25/ 4.50
Domestic Manila Rope	5.25/ 5.50
Jute Strings	6.25/ 6.50
No. 1 Sisal Strings	3.50/ 4.25
Mixed Strings	nominal
Paper Mill Tares	5.25/ 5.75
No. 1 Scrap Burlap	
Foreign	4.75/ 6.00
Domestic	5.50/ 6.50
Austr. Wool Pouches	6.75/ 7.50
New Burlap Cuttings	7.00/ 7.50

MATERIALS

Aluminum, sulfate:
coml. bags, wks. ..... cwt. 1.65
iron-free c.l. 3.25

Alcohol, ethyl:
tax free, dms. c.l. ..... gal. .62 / .97
deld. East Miss.

Alcohol, methyl:
Synthetic, Zone 1, dms.
c.l. fit. alld. ..... gal. .41

Casein, acid-prec.:
dom. sh. pt. c.l. ..... lb. .36 / .39
imp. ex dock ..... lb. .36½/ .36¾

Caustic soda:
c.l. wks. solid, 76%, cwt. 3.35
flak. & grd. 100-lb. drums ... 3.75
liquid 50% tanks 2.55
liquid 70% tanks 2.65

China clay:
dom. air-float. filler, c.l. wks. ton 10.00
water-washed 11.00
coating ..... 16.00 /30.00
imported, ex whse. ... short ton 15.20 /28.35

Chlorine:
single-unit tanks, works .. cwt. 2.70
multi-unit ..... cwt. 3.20 / 4.40

Formaldehyde:
USP, inh. dms, c.l. wks. ... lb. .0600/ .0625
l.c.l. E. wks ..... .0650/ .0675

Fuel oil:
Bunker C, No. 6 Cal. hvy
tanks, refinery ..... bbl. 1.35 / 1.60
light ..... bbl. 2.05 / 2.10

Hydrogen peroxide:
USP, 35% cbys. E. of Miss.
lb. .24½/ .25½

Lime:
hydrated, bags, wks. Buffalo ton 13.50

Rosin:
B gur , drms, c.l. Savan. .. cwt. 4.10
G. H. I. K. ..... cwt. 7.91
FF, wood, do. ..... cwt. 6.25

Rosin size:
70%, gum & pale grds, tank
cars, south, sh. pt. .... cwt. .. 6.70 / 6.90

Salt cake.
dom. bulk, c.l. wks. ..... ton 17.00
wks. frt. all. ..... ton 20.00 /22.00

Soda ash:
light, 58%, bags, wks. 1.50
bulk ..... cwt. 1.20

Sodium silicate 40°:
turbid, c.l. wks. ..... cwt. 1.20
l.c.l. wks. ..... 1.55 / 1.95

Sodium peroxide:
dms. c.l. E. of Miss. .... lb. .19
l.c.l. do. ..... lb. .19½/ .20

Soybean, protein:
chem. isol, wks. c.l. .... lb. .24 / —
Cinn. and Chic.

Sulfuric acid:
60° Be. cbys. cl. wks. .... cwt. 1.75 / —
l.c.l. wks. ..... cwt. 2.05 / 2.60

Sulfur:
crude, c.l. mines, contract, long ton 18.00 /22.00
f.o.b. vessels Gulf ..... 19.50 /21.50
Export, f.o.b. Gulf ..... 22.00 /25.00

Sulfur dioxide:
liquid, coml. cyl. wks. ..... lb. .09
multi-unit cars ..... lb. .0535

Starches:
pearl corn, bags, c.l. Chic. . cwt. 5.62 / —
white dextrines, c.l. Chic. . cwt. 6.89 / —
potato, Idaho, c.l. wks. ... cwt. 5.00 / —
potato, Maine, c.l. wks. ... cwt. 5.00 / —
tapioca, conv. dextrines. . . cwt. 6.75 / 7.50
medium grds. Gulf and East Coast ports ..... 5.75 / 6.25
low, Siam, on dock N. Y. .... 5.00 / 5.50
nominal

Talc:
domestic, 50-lb. sacks, c.l. wks. ..... ton 25.00 /30.00

Titanium dioxide:
anastase, c.l. deld., bags .. lb. .19½/ .21½
l.c.l. deld ..... lb. .20 / .22½
rutile, c.l. deld. ..... lb. .21½/ .23½
l.c.l. deld. ..... lb. .22½/ .24½

N.B.: For special market conditions, see *Trends*.

IMPORTS

IMPORTS AT NEW YORK

Week Ending Nov. 18

Newsprint

Gilman Paper Co., Fort Avalon, Cornerbrook, 70 rolls.
N. Y. Herald Tribune, Fort Avalon, Cornerbrook, 551 rolls.
N. Y. Times, Fort Avalon, Cornerbrook, 422 rolls.
N. Y. World Telegram, Fort Avalon, Cornerbrook, 1405 rolls.
Nowy Swiat Publishing Co., Fort Avalon, Cornerbrook, 41 rolls.
Amerikai Magyar Nepzava, Inc., Fort Avalon, Cornerbrook, 49 rolls.
Wall Street Journal, Fort Avalon, Cornerbrook, 446 rolls.
Hearst Enterprises, Inc., Fort Avalon, Cornerbrook, 374 rolls.
Bato Co., Inc., Fort Avalon, Cornerbrook, 264 rolls.
Heller & Uslan, Inc., Fort Avalon, Cornerbrook, 114 rolls.
H. C. Craig, Newscarrier, Donnacona, 340 rolls.
R. A. Olsen, G.T.D., Donnacona, 361 rolls.
News Syndicate Co., Robert Barnes Fiertz, Thorold, 3098 rolls.
N. Y. Journal American, Markland, Liverpool, 1616 rolls.
N. Y. Daily Mirror, Liverpool, N.S., 539 rolls.
N. Y. Herald Tribune, Markland, Liverpool, N.S., 1497 rolls.

CORROSION PLAYS NO FAVORITES

You must PROTECT OR PAY ...you have no other choice

No business escapes the effects of corrosion. It costs industry over $6,000,000,000.00 annually. Yet much of this costly damage might be avoided by taking just two simple steps –

1. Check the danger points in your plant-manufacturing equipment, piping, valves, tanks, motors, and all similar items.
2. Protect them with Amercoat–the corrosion-resistant coatings; each designed to meet specific conditions.

Most conventional coatings fail when corrosion threatens, because they are neither designed nor suited for severe service. Don't risk needless loss–protect now with Amercoat.

6-50a

AMERCOAT CORPORATION
A Division of
American Pipe and Construction Co.
4809 Firestone Blvd., South Gate, California

N. Y. World Telegram, Markland, Liverpool, N.S., 1255 rolls.
Buffalo Color Press, Markland, Liverpool, N.S., 614 rolls.
Brooklyn Daily Eagle, Markland, Liverpool, N.S., 595 rolls.
Brooklyn Eagle Press, Markland, Liverpool, N.S., 45 rolls.
Herald Statesman, Inc., Markland, Liverpool, N.S., 42 rolls.
Trade Union Service, Markland, Liverpool, N.S., 125 rolls.
W. D. Peek, Inc., Markland, Liverpool, N.S., 507 rolls.
R. A. Olsen, A.C.D., Donnacona, 374 rolls.
News Syndicate Co., Elin Hope, Baie Comeau, 7653 rolls.
R. A. Olsen, G.D.D., Donnacona, 371 rolls.

Tracing Cloth

Keuffel & Esser Co., American Scout, Manchester, 8 cs. (bleached cotton).

Wallboard

Elof Hansson, Inc., Stavangerfjord, Oslo, 278 cs.

Paperhangings

C. A. Haynes, American Scout, Manchester, 9 bls.

Wallpaper

E. Miltenberg, Igadi, Shimidzu, 3 bls. (glass-cloth).
C. R. Gracie & Son, Igadi, Taku Bar, 2 cs. (handpainted).
C. A. Haynes, American Scout, Liverpool, 558 ctns.
Taub Hummel & Schnall, American Scout, Liverpool, 821 ctns.

Sulphite Paper

B. M. Heede, Stavangerfjord, Oslo, 59 bls.

Tissue Paper

B. F. Drakenfeld & Co., Parthia, Liverpool, 17 cs. (gauze carbonizing), 12 cs. (pottery).

Writing Paper

R. Howe, Averdy, Rotterdam, 5 cs.
Leading Forwarders, America, Havre, 1 cs.
H. W. Robinson & Co., America, Havre, 1 cs.
All Transport, Inc., America, Havre, 3 cs.

Printing Paper

Oxford University Press, Parthia, Liverpool, 9 cs.
E. de Vries, Blommersdyk, Antwerp, 2 cs.
Drukkerij Pers, Averdyk, Rotterdam, 10 cs.
E. doe Vries, Averdyk, Rotterdam, 8 cs.

Gummed Paper

B. F. Drakenfeld & Co., Parthia, Liverpool, 74 cs.

Photo Paper

J. J. Gavin & Co., Queen Elizabeth, Southampton, 6 cs.

Wrapping Paper

Southimco Mercantile Co., Bloemersdyk, Antwerp, 26 cs.

Rice Paper

Jaeger & Krum, Olga Maersk, Keelung, 10 cs.

Cigarette Paper

Suarez & Crespo, Exceller, Barcelona, 5 cs.

Uncoated Paper

F. C. Strype, Averdyk, Rotterdam, 47 cs.

Miscellaneous Paper

Potdevin Export Corp., Stavange Fjord, Oslo, 1 roll.
Olympic Shipping Co., Heina, Rouen, 56 cs.
Lansen Naeve Corp., Examiner, Leghorn, 1 cs.

THE H. K. FERGUSON COMPANY
PAPER MILL ENGINEERS & BUILDERS
Complete Service for Design, Construction, Equipment Installation, Engineering Reports and Surveys
Executive Offices
Ferguson Building, Cleveland
District Offices
19 Rector St., New York M & M Bldg., Houston, 120 S. LaSalle St., Chicago, 2975 San Fernando Road, Los Angeles, 21 E. 12th St., Cincinnati

Rags, Baggings, etc.

(———), American Scout, Manchester, 76 bls. Hessians.
E. Butterworth & Co. Inc., American Scout, Manchester, 72 bls. Hessians.
Wallworth & Co., American Scout, Manchester, 38 bls. cotton waste.
Loumar Textile By Products, American Scout, Manchester, 32 bls. paperstock, 2 bls. bagging.
A. Siegle Corp., American Scout, Manchester, 139 bls. jute waste.
Darmstadt Scott & Courtney, Carrier, Bombay, 169 bls. ld Hessian rags, 115 bls. rags.
(———), American Shipper, Dunkirk, 66 bls. old bagging.
Trade National Bank, American Shipper, Dunkirk, 44 bls. cotton waste.
Midwest Waste Materials Co., American Shipper, Bordeaux, 42 bls. cotton rags.
Luth Cotton Products, Jalaketu, (———), 500 bls. cotton waste.
Railway Supply & Manufacturing Co., Jalaketu, (———), 100 bls. cotton waste.
Padawer Waste & Fiber Co., Jalaketu, (———), 200 bls. cotton waste.
(———), Rialto, Hull, 80 bls. scrap bagging.
Jay Bee Fiber Corp., Heina, Rouen, 329 bls. cotton waste.
D. Benedetto, Heina, Rouen, 184 bls. rags.
J. P. Fleissig, Heina, Rouen, 52 bls. canvas cuttings.
(———), Heina, Rouen, 308 bls. canvas cuttings.
Harris Goldman Co., Heina, Rouen, 60 bls. canvas cuttings.
(———), Exceller, Venice, 139 bls. rags.
1st National Bank of Boston, Exceller, Venice, 36 bls. old bagging.
Castle & Overton, Inc., Macharda, Calcutta, 91 bls. cotton waste.
J. Greece Co., Examiner, Piraeus, 484 bls. rags.
E. J. Keller Co. Inc., Examiner, Piaracus, 155 bls. rags.
Manufacturers Trust Co., Examiner, Genoa, 170 bls. old bagging.
Darmstadt Scott & Courtney, Black Condor, Antwerp, 94 bls. jute bagging.
(———), Black Condor, Antwerp, 225 bls. old bagging.
Manufacturers Trust Co., Black Condor, Antwerp, 61 bls. cotton waste.
A. Siegle Corp., Black Condor, Antwerp, 213 bls. cotton waste.
C. Stockheimer, Black Condor, Antwerp, 64 bls. scrap bagging.
Padawer Waste Fiber Co., Hoegh Silverstream, Bombay, 200 bls. cotton waste.
Kauders Steuber Co., Hoegh Silverstream, Bombay, 50 bls. cotton waste.
Luth Cotton Products Co., Hoegh Silverstream, Bombay, 250 bls. cotton waste.
(———), Hoegh Silverstream, Bombay, 200 bls. old jute rags.
Brandwein Mazur Co., Hoegh Silverstream, Bombay, 100 bls. cotton waste, 100 bls. old jute rags.
W. Intner, Hoegh Silverstream, Bombay, 100 bls. cotton waste.
Chemical Bank Trust Co., Hoegh Silverstream, Bombay, 100 bls. old jute rags.
Railway Supply & Manufacturing Co., Hoegh Silverstream, Bombay, 100 bls. old jute rags.
O'Brien Products, Hoegh Silverstream, Bombay, 100 bls. cotton waste.
Darmstadt Scott & Courtney, Hoegh Silverstream, Bombay, 41 bls. rags.
Cowa Co., Uruguay, Rio de Janeiro, 172 bls. cotton waste.
(———), Expediter, Venice, 170 bls. rags, 96 bls. bagging.
National City Bank, Expediter, Venice, 104 bls. jute waste bagging.
1st National Bank of Boston, Expediter, Venice, 208 bls. old jute bagging.

Casein

Borden Co., Chemical Division, Kaituna, Auckland, 400 bags.
American Cyanamid Co., Kaituna, Auckland, 1200 bags.
M. Snedeker Corp., Mormacmar, Buenos Aires, 500 bags.
American British Chemical Supplies, Uruguay, Buenos Aires, 500 bags (lactic), 25,000 kilos.
Crawford & Co., Uruguay, Buenos Aires, 1,000 bags (lactic), 50,000 kilos.
E. Lang, Inc., Uruguay, Buenos Aires, 500 bags (lactic), 25,000 kilos.
Borden Co., Chemical Divtsion, Uruguay, Buenos Aires, 700 bags (lactic), 35,000 kilos.

Woodpulp

Price & Pierce, Ltd., Markland, Liverpool, N.S., 969 bls. unbleached sulphite pulp.
K. O. Hoble, Stavangerfjord, Oslo, 1,000 bls. wet mechanical pulp.
(———), Exceller, Trieste, 680 bls. sulphite pulp.
Bulkley Dunton Co., Averdyk, Hamburg, 669 bls. prime bleached sulphite pulp.
China American Paper & Pulp Co., Exermont, Trieste, 1,269 bls. chemical pulp.

Woodpulp Sheets

Absorbo Beer Pad Co., Exermont, Trieste, 250 bls.

IMPORTS AT PHILADELPHIA

Week Ending Nov. 18

(———), American Scout, Liverpool, 22 crates wallboard.
F. B. Vandegrift & Co., American Scout, Liverpool, 802 ctns. wallpaper.
Raven Import Corp., Olga Maersk, Keelung, 25 cs. rice paper.
J. P. Fleissig, American Shipper, Bordeaux, 271 bls. rags.
J. P. Fleissig, Heina, 437 bls. canvas cuttings.
1st Ntaional Bank of Boston, Exceller, Venice, 190 bls. old cotton rags.
E. J. Keller Co. Inc., Black Condor, Antwerp, 60 bls. old bagging.
Wallworth & Co., Black Condor, Antwerp, 100 bls. jute waste.
Elof Hansson, Inc., Expeditor, Trieste, 1,090 bls. chemical pulp.

IMPORTS AT BOSTON

Week Ending Nov. 18

Darmstadt Scott & Courtney, American Scout, Liverpool, 48 bls. threads.
(———), American Scout, Liverpool, 2 bls. cotton tracing cloth.
Green Textile Association, American Scout, Liverpool, 31 bls. cotton waste.
Holbert & Myette, American Scout, Liverpool, 16 bls. gluestock.
Stone & Downer Co., American Scout, Liverpool, 1,968 ctns. wallpaper.
Elliott Addressing Machine Co., Olga Maersk, Kobe, 15 cs. tengujo paper.
S. H. Waldstein, American Shipper, Dunkirk, 83 bls. cotton waste.
1st National Bank of Boston, Exceller, Venice, 171 bls. old cotton rags.
Borden Co. Chemical Division, Bowhill, Buenos Aires, 500 bags casein.
P. A. Dunkel, Bowhill, Buenos Aires, 500 bags casein.
J. Gorvers, Bowhill, Buenos Aires, 92 bls. gluestock.
New England Waste Co., Bowhill, Santos, 47 bls. cotton waste.
China American Paper & Pulp Co., Exermont, Trieste, 3,047 bls. chemical pulp.
(———), Exermont, Trieste, 1,110 bls. bleached sulphite pulp.
Leigh Textile Co., Hoegh Silverstream, Bombal, 300 bls. cotton waste.
Miller Waste Mills, Hoegh Silverstream, 150 bls. cotton waste.
Volkart Bros., Hoegh Silverstream, Bombay, 128 bls. cotton waste.

IMPORTS AT BALTIMORE

Week Ending Nov. 18

Perkins Goodwin Co., Blommersdyk, Rotterdam, 119 bls. printing paper.

A. de Vries Trading Corp., Blommersdyk, Rotterdam, 139 bls. paperstock.
Bunge Pulp & Paper Co., Exermont, Trieste, 269 bls. chemical pulp.
The Borregard Co. Inc., Exermont, Trieste, 2,505 bls. chemical pulp.
(———), Expediter, Trieste, 875 bls. chemical pulp.
1st National Bank of Boston, Expediter, Venice, 67 bls. old cotton.

IMPORTS AT NORFOLK

Week Ending Nov. 18

W. M. Stone, American Scout, Liverpool, 4 cs. tissue paper.
Pulpaper Co., Heina, Antwerp, 780 rolls newsprint.
National City Bank, Heina, Antwerp, 97 bls. scrap bagging.
(———), Exceller, Venice, 97 bls. jute waste.
E. J. Keller Co. Inc., Black Condor, Antwerp, 377 bls. jute waste.
Norton & Ellis, Black Condor, Antwerp, 338 bls. scrap bagging.
E. Butterworth Co. Inc., Black Condor, Antwerp, 88 bls. old bagging.
E. J. Keller Co. Inc., Hoegh Silverstream, Bombay, 132 bls. old jute rags.
(———), Expediter, Venice, 183 bls. jute waste, 19 bls. baggings.

NEW LITERATURE

Nasko Machinery Corp. Bulletin, "New Improved Post-War Model NS-24 Flat and Square Bag Machines."

The Bin-Dicator Co. "Bin-Flo Aerator Unit." Provides aerator layouts, specifications, air supply data and typical applications for flow of bulk materials from bins, hoppers and chutes.

Johns-Manville. Brochure, "Clipper Seal." Handbook of useful data on principle of Clipper Seals, construction, advantages in various applications, and installation for oil seal users.

Reliance Electric & Engineering Co. Service Bulletin A-2025, "Authorized Service Shops in the U.S.A."

Ingersoll-Rand Co. Bulletin, Form 7233, "Multi-Stage Centrifugal Pumps —Class HMTA for Pressures up to 1200 psi."

The Esterline-Angus Co., Inc. "The Graphic," Bulletin Number 950, "'Let's Look at the Record'— Industrial Production Monitored by Automatic Recorders."

Joy Mfg. Co. Bulletin 76-X, "Single Drum Hoists." Specifications and description of multi-purpose hoists for mines, construction jobs, oil fields and industrial plants.

Greene, Tweed & Co. Illustrated Catalog PC-101, "Palmetto Packings." Covers Palmetto self-lubricating, molded and sheet packings; points up application, structure and performance for each individual packing.

Eutectic Welding Alloys Corp. Folder, "Photo-Micrographs to Prove the Superiority of Eutectic Welding Alloys." Shows application of an assortment of alloys on a wide range of metals; provides question and answer information.

Milton Roy Co. Bulletin MP-50, "miniPump—A New Milton Roy Controlled Volume Pump for Handling Minute Quantities of Clear Liquids."

American Cyanamid Co. Pamphlet, "Looking Ahead." "Rosin Size—Automatic Emulsifying System." Technical data on handling of rosin size.

Towmotor Corp. Accessory Data Sheets, "Revolving Carriage"; "Overhead Guard." Features their use on fork lift trucks.

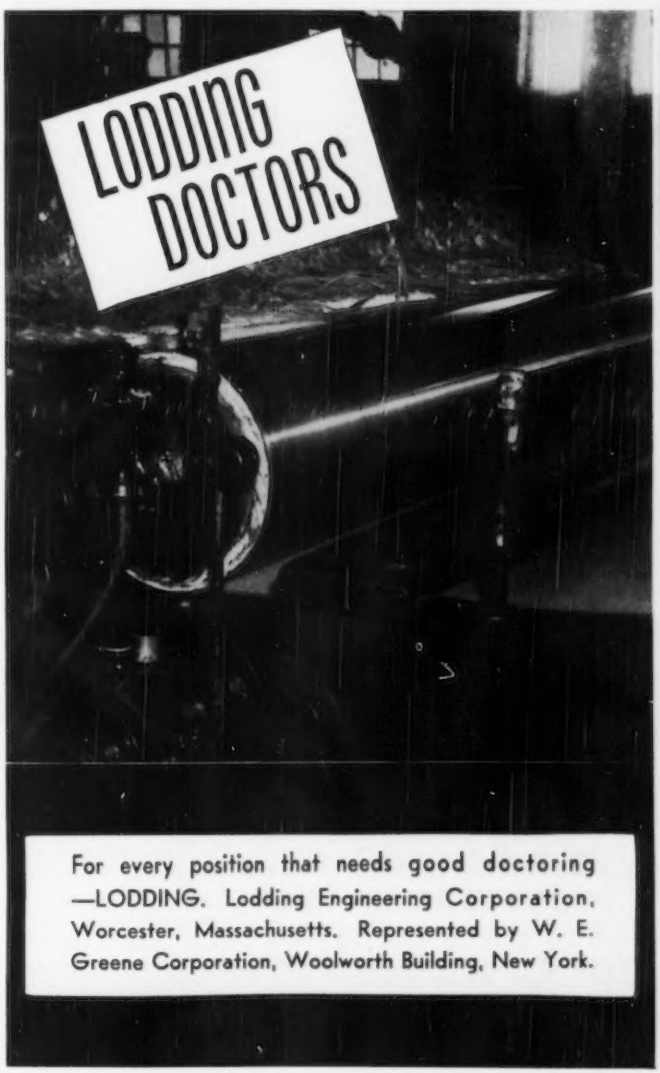
Carboline Co. New Product Data Sheet, "Chlorclad." Lists uses, advantages, applications, and prices. Application Data Sheet, G-301, "Phenoline Protected Concrete Floors." Covers application of thermosetting coating for increased corrosion resistance and increased wear.

General Electric Co. Bulletin GEA-5506, "Synchronous Motor-Generator Sets, 30 to 8000 KW." Shows four typical installations; describes construction features of synchronous motors and d-c generators.

Worthington Pump & Machinery Corp. Bulletin AS-1600-B3, "Allspeed Drive." Features new variable speed transmission series.

United Laboratories, Inc. Report No. S-307, "Certified Hydropel." Data sheet on a new formulation containing silicone. Prepared for those interested in a transparent liquid waterproofing for unpainted exterior masonry and stone surfaces.

American Paper & Pulp Assn. Booklet, "Ten Years of Microbiological Re-


LODDING
DOCTORS
For every position that needs good doctoring —LODDING. Lodding Engineering Corporation, Worcester, Massachusetts. Represented by W. E. Greene Corporation, Woolworth Building, New York.

AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

	Oct. 14	Oct. 21	Oct. 28	Nov. 4*	Nov. 11
1950	107.5	107.0	106.8	108.2r	107.6
	Oct. 15	Oct. 22	Oct. 29	Nov. 5	Nov. 12
1949	*97.1*	*98.6*	*97.7*	*99.3*	*99.3*

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg
1949	*94.6*	*92.8*	*89.1*	*85.1*	*82.7*	*78.6*	*72.8*	*87.6*	*89.7*	*96.0*	*98.2*	*89.8*	*88.0*
1950	97.6	100.8	101.9	100.5	100.8‡	103.2‡	90.8‡	105.8‡	101.7‡	106.7‡			

* Weekly capacity base increased by 955 tons.
r Revised.
‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1943	1944	1945	1946	1947	1948	1949	1950
Year to Date	88.4	88.5	89.4	101.3	104.3	97.2	87.9	101.6
Year Average	87.8	88.1	89.4	100.1	104.3	96.2	88.0	

PAPERBOARD OPERATING RATIOS†

	Oct. 14	Oct. 21	Oct. 28	Nov. 4	Nov. 11
1950	102	101	104	102	101
	Oct. 15	Oct. 22	Oct. 29	Nov. 5	Nov. 12
1949	*94*	*94*	*94*	*92*	*94*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1949	*88*	*85*	*79*	*79*	*78*	*75*	*64*	*86*	*87*	*94*	*93*	*83*	*83*
1950	88	92	91	92	91	94	82	100	96	94			

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

search." A summary report on the microbiological survey of packaging papers, it presents evidence that paper as a packaging medium has no adverse effects upon the public health.

Supt. of Documents, U. S. Govt. Printing Office. Circular 498, price 20c, "Bibliography of Recent Research in the Field of High Polymers," released by Bureau of Standards. Reference list of both American and foreign scientific papers on high polymers. Also covers plastics, rubbers or textiles.

NEW EQUIPMENT

Unicel Railroad Car

The new car, called Unicel, is described as the first major improvement in railroad freight car construction since 1898. A combination freight-refrigerator car, it is designed to meet the need for low-cost mass transportation of pulpwood, paper and paper products. Unlike conventional cars whose strength depended upon the strength of its individual members, all based upon a center sill of steel, Unicel is a functional unit which derives its strength from its shape. Sides, floor and top are actually molded together by radio frequency energy. This produces a single organic structure something like multi-engined planes. Instead of bearing all its impact on a center sill, the car distributes the stresses and strains it gets on the rails evenly throughout its entire body. As a result, though far lighter, it is much stronger. Since stresses are spread through the entire "skin" of the car, the entire "skin" of the car works in carrying the load. The conventional car carries its freight primarily on the car bottom; the sides and top being used essentially for enclosure rather than for protection.

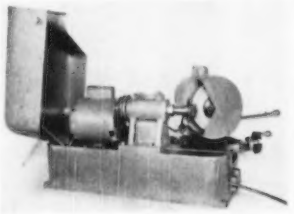
General advantages for paper and pulp industry are seen to be in safer and cleaner transportation. The car provides 40 percent more floor area, and sharply cuts handling costs, it is said. Because of wide doors, extensive use of fork-lift trucks and palletizing is possible. A demountable floor-rack made of special steel alloy enables the fork-lifts to move about inside car and makes for greater safety. A new dunnage device called "unistrapping" permits loads to be sectionalized and broken down into units for lcl quantities. The *coldwall*, plus the natural qualities of the cellular one-piece structure, prevents the condensation of moisture on ceiling. Temperature constancy is rated at 2 to 3 degrees, capacity at 65 tons.

Vertical Beater and Washer

The new mechanical device is described as a vertical beater and washer which beats, washes, bleaches and refines the rag pulp in one operation at great saving of time over the conventional horizontal beater. The machines weigh from 20 to 40 tons and are seen by the manufacturer as promising improved facilities for making higher grade papers.

Slitter-Grinder

The new "PG" slitter-grinder was designed for precision grinding and polishing of score-cut slitter wheels. The unit can handle either large 4½" mill-type wheels or the smaller 3" wheels. A calibrated scale controls the adjustment of the pivot-mounted grinding assembly to assure perfect centralization of the cutting edge.



Three-speed control of the work-arbor drive allows for quick change-over and adapts the speed to either size wheel and up to 3600 r.p.m. for polishing. Grinder is approximately 24" x 12" x 15" and has a heavy base to absorb any vibration. Motor powering the work arbor is covered with a cast aluminum guard. A diamond point dresser is provided for redressing the grinding wheel when needed.

Rotary Bark Screen

The rotary bark screen is designed to separate the water from the bark as sluiced out from the sewers of the wood-room or mill buildings to the river. Regulations pertaining to stream pollution have activated the need for such a screen. Successful Canadian installations followed original development.

W. C. HAMILTON & SONS, Miquon, Pa., announces that S. H. Popovich has been made director of quality control, and W. O. Kincannon, Jr., has joined the technical staff.

OBITUARIES

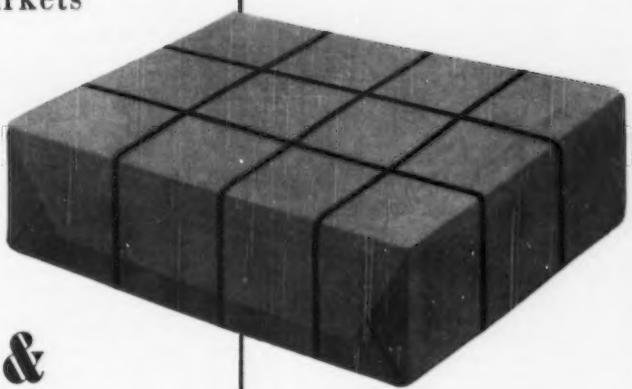
Homer B. McCormick, 56, superintendent of pulp preparation and stores for the Scott Paper Co., Chester, Pa., died November 14. Mr. McCormick had been associated with the Scott firm for 15 years. Surviving are his widow, Margaret, and a son, H. Barker McCormick.

James N. Bronner, 37, stock superintendent at the Sutherland Paper Co., died November 9. He is survived by his widow, Louise, and two step-daughters.

Frederick Ruth, 63, treasurer of the Buffalo Paper & Twine Co., Inc., died November 11 at his home in Buffalo, N. Y.

Lyddon & Co.

exporters of wood pulp
to all world markets



Parsons & Whittemore

paper exporters
wood pulp

London
Paris
Zurich
Stockholm
Oslo
Sousse
Montreal
Buenos Aires
Sao Paulo

10 East 40th Street, New York 16, N.Y.

CLEARING HOUSE

HELP WANTED

MEN WANTED
POSITIONS OPEN

We can place—technical director 2 machine paper mill; superintendents and foremen for paper converting plants; managers and superintendents roofing felt mills; superintendent specialty rag paper mill; managers and superintendents for bag and box factories; employment man for Mid West.

Mechanical or industrial engineers; production engineer for research work; development engineer (double); chief engineer with M.E. degree; chemists, chemical engineers and laboratory men for paper mills also for selling positions; heater engineers; tour leaders.

Master mechanics, plant engineers, designers, draftsmen and head draftsman for mills and for firms building paper and pulp mill machinery; foremen for Fourdrinier and Cylinder machines; salesman for mechanical equipment, will consider mechanical engineer, supt. or asst. supt. qualified to sell.

LIST YOUR CONFIDENTIAL APPLICATION WITH US

We will keep you informed of attractive positions open in the pulp and paper mills.

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St., Boston 8, Mass.
SPECIALISTS IN PLACING PULP AND PAPER MILL EXECUTIVES

N-23

WHAT A JOB

For a master mechanic. A one-machine mill in the East producing folding grades offers good salary, good future opprtunity, pleasant surroundings and nice people to work with. Only substantial men who appreciate the better things in life need apply. In so doing, state previous experience, age, education and expected compensation. Address Box 50-567 care Paper Trade Journal. D-7

WANTED
BAG FACTORY SUPT.

To run modern paper bag making plant specializing in plain and printed kraft bags of many types. Applicents must be experienced in adjusting, machine maintenance, trouble shooting, and supervision. Our people know of this ad. Give complete data first letter including age, experience, salary requirements. Confidential.

Box 50-551, care Paper Trade Journal.
N-23

"WE HAVE EXCELLENT OPENING for a machine designer with experience, preferably in pulp and paper mill or heavy machinery. Technical graduate or equivalent desired. Salary commensurate with ability. This is a permanent position. When replying, please give details, including experience, qualifications and salary expected.

THE APPLETON MACHINE COMPANY
Appleton, Wisconsin

N-23

WANTED

Beater Engineers and Back Tenders for one machine mill in East, making folding grades. Must be experienced. Good pay and steady employment. Address Box 50-543 care Paper Trade Journal. N-23

YOUR BOSS wanted for Board Mill in East. Must have experience on folding grades. Address Box 50-473 care Paper Trade Journal. TF

HELP WANTED

CHEMICAL ENGINEER

Degree not essential. Must have actual experience in research and development work on wood fiber insulation board products. Experience in field of coatings and acoustical products valuable. Unusual opportunity for person with necessary background and experience. Permanent position, with large manufacturing plant in South. Good salary. Only qualified need apply. Replies confidential. Our personnel know of this ad. Address Box 50-532 care Paper Trade Journal. N-23

PRODUCTION CHIEF

Paper converting, nationally known. Printing, coating, gumming, laminating, finishing operations. Lifetime position for top-flight production executive. Our people know of this ad. Send full details confidentially to President, Box 50-443, care Paper Trade Journal. TF

WORKING SUPERINTENDENT for small, fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 50-378 care Paper Trade Journal. TF

SALARIED POSITIONS $3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (40 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops avertures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
117 Dun Bldg., Buffalo 2, N. Y.

TF

WANTED — SALES ENGINEER — Experienced in Pulp and Paper Mills, for sales and service work. Excellent opportunity with old established machinery manufacturer. In reply, give resume of education, experience and current salary. Address Box 50-513 care Paper Trade Journal. TF

WANTED — Experienced Machine Tenders, Back Tenders, Third and Fourth Hands, Beater Engineers. For .016 and .009 cylinder and fourdrinier jute mills, located in Reading, Penna. Seven day week. Apply, Reading Corrugated Container Corp., Box 317, Reading, Penna. Phone, Reading 7123. N-23

WANTED—Engineering draftsmen for drawing board work on heavy machinery. Men with paper mill experience preferred. State age, experience and salary expected. The Bagley & Sewall Co., Watertown, New York. Phone 1200. D-7

WANTED—Machine Tender for Cylinder Tissue Paper Machine in mill near Lancaster, Pa. Address Box 50-573 care Paper Trade Journal. N-30

WANTED—Machine Tender and Back Tender for cylinder machine making folding grades. Must be experienced. Steady work. Good pay. Address Box 50-573 care Paper Trade Journal. D-14

WANTED—Working Foreman experienced in manufacture of paper plates, forks, spoons, etc. for new plant to be set up in Southeastern coastal city. Give full particulars. Address Box 50-579 care Paper Trade Journal. N-23

PERSONNEL SERVICE ASSOCIATES, 115 State St., Springfield, 3, Mass. Specialized Confidential Placement Service for the Paper and Allied Industries. Personnel Consultants. N-23

HELP WANTED

WANTED—CHEMIST—Experienced on paperboard. Splendid opportunity for advancement, reasonable present compensation. Please write us giving complete information as to experience, age, education and expected remuneration. Address Box 50-568 care Paper Trade Journal. D-7

MID-WESTERN FOURDRINIER SPECIALTY MILL has opening for experienced Day Superintendent—Chemist. References required. Address Box 50-574 care Paper Trade Journal. N-23

SITUATIONS WANTED

EXPERIENCED
KRAFT PULP AND PAPER MILL ENGINEER AND OPERATOR

wants to contact mills.

Cement Sacks, Gumming, Envelopes and other Specialties.

Address Box 50-439 care Paper Trade Journal. D-7

PLANT MANAGER—Manufacture and conversion of boards and papers; wants change for greater opportunity. Competent and successful in organization; production; and labor relations. Address Box 50-521 care Paper Trade Journal. N-30

SUPERINTENDENT—Energetic young man desires to make change. Experienced on Yankee Fourdrinier machines manufacturing facial, towels, toilet tissue and napkins (colored and white). Good, steady conscientious worker. Starting salary $7500 plus moving charges. Address Box 50-538 care Paper Trade Journal. N-23

COATED PAPER—Assistant to Superintendent in a surface coating paper mill. Twenty eight years of experience. Forty seven years of age. Married. Address Box 50-580 care Paper Trade Journal. N-23

EXECUTIVE—Over 20 years experience all phases Baz. Envelope Manufacture—Kraft, Glassine, Cellophane—knows production, sound administration, sales management, promotion. Seeks affiliation progressive firm with faith in tomorrow, not dismayed by word "allocation." Address Box 50-583 care Paper Trade Journal. N-30

FOR SALE

SEYBOLD KNIFE GRINDER

92 inch—A-1 shape—no motor—a steal at $500 f.o.b.

Printers Trouble Shooter
New Haven, Conn.

N-23

PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon, Laboratory Coating and Treating and Flat Ream Measuring and Converting Machines. New improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester, 11, N. Y. TF

INTERESTED in Cartons, impervious or resistant to water, to be used for packing head lettuce. 13 x 21¼ x 9½ deep. Prospects of millions of containers yearly. Schoenburg Bros. Produce Co., Salinas, Calif. N-23

FOR SALE—18 x 36, Model 11, right hand Rollins engine, develops 300 H.P. Also, 30" belt, line shafting, complete electrical equipment and rope main drive. Cascade Paper Company, Brown Street, North Adams, Mass. N-23

FOR SALE—Complete equipment for de-ink plant based on the latest processes. Address Box 50-517 care Paper Trade Journal. N-23

FOR SALE

60″ Trim Downingtown Six Cylinder Board Machine consisting of: Six cylinder molds 36″ x 70″ with 18″ R. C. couch, cast iron vats, 1—Suction box, three sets of primary presses, three sets of main presses, 37—dryers 36″ x 64½″, 8—dryers 42″ x 73″, 1—7 roll calender, duplex cutter, pump and auxiliary equipment. Standing on dry end drive is on the right. Machine in good operating condition, 25 to 30 tons per 24 hours.

FRANK H. DAVIS CO., 175 Richdale Ave., Cambridge, Mass.

N-23

ROSS PAPER MACHINERY CO.

265 PASSAIC STREET
NEWARK 4, N. J.

CONVERTING PAPER MAKING EQUIPMENT

NEW, USED, REBUILT PAPER AND PULP MACHINERY

MACHINERY WANTED
For outright purchase—
Paper Machines, Paper Mill Machinery and Converting Equipment.

AMERICA'S LARGEST BUYERS OF PAPER MAKING MACHINERY

BELTING—NEW
87 feet 8″ 13 ply Goodyear Rubber Belting.
583 feet 8″ 4 ply Silver Duck Transmission belt.
177 feet 10″ 6 ply Silver Duck Transmission Belt.

CALENDER ROLLS
46 Chilled Iron Rolls—Assorted sizes.

CALENDER STACKS
1—112″ face 7 roll.

COATER—Board Machine
1—Beloit Board Machine Coater. Used on 115″ machine.

CONVEYOR
1—18½ ft. long x 30″ wide—with motor.

CORE CUTTERS
1—Cameron with 2″ x 1½″ mandrels.

COUCH ROLLS—Rubber
2—152″ face x 12″ diameter—Ball bearing.
1—152″ face x 22″ diameter—Ball bearing.
2—147″ face x 19″ diameter.
1—146″ face x 15″ diameter.
1—145″ face x 13½″ diameter. Ball bearing.
1—137″ face x 15″ diameter.
1—110″ face x 20″ diameter. New.

CYLINDER MOLDS
1—134″ face x 36″ diameter, with stainless steel shafts.

DRIVES—ENCLOSED HERRING BONE GEAR
4—Falk right angle 75 hp—ratio 6.31-1.
1—Falk right angle 255 hp—ratio 7.14-1.
1—Falk straight 275 hp—ratio 1.97-1.
1—Falk straight 255 hp—ratio 3.12-1.
Above complete with clutch pulleys.

DRIVES—ENCLOSED DIRECT MOTOR CONNECTED
2—Falk 15 hp—ratio 38.6-1 with motor.
2—Falk 7.5 hp—ratio 23.4-1 with motor.
1—Falk 7.5 hp—ratio 45-1 with motor.
2—Falk 5 hp—ratio 63-1 with motor.
Above complete with panel controls, D. C. Generator and converter.

DRYERS
5—143″ face x 48″ diameter.
5—124″ face x 48″ diameter.
5—80″ face x 36″ diameter.
1—77″ face x 48″ diameter—with gear.
1—64″ face x 36″ diameter.
1—120″ face x 16″ diameter—Baby Dryer.
56—126″ face x 42″ diameter.
4—96″ face x 36″ diameter.
1—102″ face x 48″ diameter, with bearings.
4—100″ face x 48″ diameter—with gears and bearings.
3—110″ face x 42″ diameter with bearings and gears.
1—117″ face x 48″ diameter.
1—54″ face x 36″ diameter.
6—46″ face x 48″ diameter. Chrome plated with gears and bearings.
1—46″ face x 18″ diameter. Chrome plated with gears and bearings.

FILTER PRESS
1—New Sperry filter press, size 12, type 41.

FLAT SCREENS
4—8 plate Sandy Hill Roller Shoe with scrapers.
4—11 plate Beloit Roller Shoe with scrapers.

FOURDRINIER SECTIONS
1—P & J 156″ x 80 ft. ball bearing. Complete from Inlet to 22″ diameter suction couch. Brass and Rubber covered table rolls. 6 Brass Suction Boxes operated at 1000′ per minute.

JORDANS
1—#6 Miami, for motor drive.
5—Jones Majestics with base and couplings—
2—#3 Appleton with base and coupling.
1— Jones Majestic. Stainless Steel Filling.

LAMINATOR
1—Downingtown 52″ Laminator.

MOTORS
1—Reliance 25 h.p. ball bearing, 550 v., 3 phase, 60 cycle—1750 r.p.m.

PULP EQUIPMENT
1—Mitts & Merrill #17 Pulpwood chipper.
1—Trimbey pulp screen with scraper.
5—Waterous 3 pocket grinders, 32″ wood. Complete with load regulators, speed regulators, motors and starters. Latest type. Used 3 years.
1—Bird ball bearing Pulp Screen. Practically new. Used 6 months.
5—APMEW Ball Bearing Pulp Screens—30 ton capacity.

PULPERS
2—#2 Lannoye with enclosed Falk Drives. New.

PUMPS
44—Centrifugal Pumps, open & closed impellers. Direct connected or Belt Driven. Extended base for motor. Assorted capacities and heads. Most used less than one year. Also new Goulds Pumps.

REDUCERS
1—Link Belt 40 h.p. Ratio 2.2-1. 560 r.p.m.-227 r.p.m.
1—Falk 25 h.p. Ratio 300-1. 900 r.p.m.-3 r.p.m.

REELS
1—Beloit 132″ two bowl upright reel.
1—Beloit 116″ two bowl upright reel.

REFINERS
1—#1 Claflin Ball Bearing.

ROLL GRINDER
1—Farrel Birmingham—will take roll 114″ face x 25″ diameter maximum.

ROLLS—PRESS, COUCH, etc.
32—Press rolls, brass and rubber covered.
14—Couch rolls, brass and rubber covered.
250—Brass and steel carrying rolls.

ROTARY SCREENS
4—#2A Bird, fully rebuilt with new vats, plates, etc.—enclosed drive.
2—#2 Bird—copper vats.

SAVEALLS
1—Oliver, Cylinder 120″ face x 65″ diameter. With iron vats.

SCREW PRESSES
1—Valley Voith Screw Press Size 2A, with new spare sets of plates.

SHEETERS
1—Finlay 90″ with 6 roll back stand, motor and 4 slitters.
1—42″ Dillon with 6 roll backstand.
1—48″ Kidder Spot Sheeter.
1—Beloit 72″ Heavy Duty Duplex Sheeter.

SHREDDERS
1—American 32″ Hamermill, anti-friction bearing.
1—Sprout Waldron Cutter—type F-11—30″ knives. Used 30 days.

SLITTERS AND WINDERS
1—Pusey & Jones 160″ high speed slitters and rewinders.
1—Cameron 62″ Model 6.
1—Cameron 72″, Model 10-5.
1—Kidder 120″ Paper Machine Slitter and Winder—42″ rewind.
1—Moore & White 120″ Four Drum Paper Machine Slitter and Winder—60″ rewind.
1—Beloit 125″ Paper Machine Slitter and Rewinder—42″ rewind.

STUFF PUMPS
1—Shartle 8½x12 Triplex—Silent Chain Drive
1—Shartle 10 x 20 Triplex.

SUCTION BOXES
2—108″—all bronze.

SUCTION COUCH ROLLS
1—Millspaugh 22″ diameter x 138¾″ cyclo-face.
1—Millspaugh 22″ diameter x 158″ drilled face.
1—Millspaugh 95″ drilled face x 22″ diameter.
1—Beloit 84″ face x 16″ diameter—Ball bearing.

SUCTION PRESS ROLLS
1—Millspaugh 131″ drilled face x 22″ diameter with stand & drive.

SUPERCALENDERS
1—66″ Perkins 7 roll—with all electric equipment.

THICKENERS
1—50″ Thickener—new wood vat.
1—Bird Thickener Iron End Vats—Cylinder 72″ face x 42″ diameter, with Shower and Felt take off roll.
1—Woods Thickener Cylinder 90″ x 16″ with showers and doctor. Gear head motor drive. Used 2 months.

VATS—STAINLESS STEEL
2—Dual Flow Stainless Steel vats for cylinders 40″ diameter x 135″ face—with stands for couches.

WATER FINISH UNIT
1—Valley Micromist Unit for water finish on paper—120″ deckl.

WAXING MACHINE
1—Waldron 40″ Waxer and Impregnator.

FOR SALE

CAMERON SLITTERS

1—84" Type 10—Model 14. Late Type.

1—72" Type 10—Model 5. Late Type.

1—62" Shear cut, Type 6.

1—62" Type 6.

1—42" Type 26, Model 2A.

1—32" Type 40, Model 2A.

1—65" Kidder Late Type Super Speed Junior Model Shear Cut Slitter & Rewinder.

1—62" Waldron Shear Cut Slitter & Rewinder.

1—30" Type A Langston Shear Cut Slitter & Rewinder.

1—30" Type A Langston Shear Cut Slitter & Rewinder.

1—62" Langston Type A Shear Cut Slitter & Rewinder. Maximum Rewound Roll 50" Diameter.

POWER PAPER CUTTERS:

5—Seybold, 1—40" 10Z, 1—54" Holyoke, 1—54" 20th Century, 1—60" 20th Century, 1—72" 20th Century. 2—Oswego, 44" and 57". 1 Sheridan, 1—50". 2—Acme, 32" and 42". 1—S&W Undercut, 63".

1—McCade Mfg. Co.'s facial tissue paper folding machine with AC motor. Production 40 to 50 gross in 8 hours. 400 count. 8" x 10".

2—81" Dietz Toilet Paper Perforators. Sheets 4⅝ x 4½ and 4½ x 5 and paper towels perforated 7⅝ and 13⅛".

1—81" Hudson Sharp Toilet Perforator.

1—Paper Converting Machine Co. ¼ fold, 2 web napkin folder with embossing attachment, Extra Embossing rolls.

1—Pickett Garment Bag Machine, making bags 36" and 54".

1—Potdevin, Model 83 Sack Machine. 1 lb. to 5 lb. size range.

8—Potdevin Bag machines with two color printing units. 1—Type 293, size 9693-303, flat and square bags. 4—Type 212 Size 9112-301, satchel bottom and flat bags, 3—Type 91 F&S Size 1, Flat and square bags.

2—Lockport Flat & Square Bag Machines. One #2; one #3.

1—20" Champlain 4-color Rotogravure Press.

1—32" 3-color Aniline Printing Press for tailprinter on a Bag Machine.

2—Duplex Sheeters. 1—64" Dillon and 1—94" Moore & White.

1—94" Dillion Duplex Rotary Sheet Cutter, with 24 roll back-stand and Brannan Ream Folder.

1—81" Hudson-Sharp Embossing Machine.

1—45" German Dornbusch Embossing machine with two sets of embossing rolls.

1—38" Holyoke Roll to Roll Embosser. Heavy Type. Two New Steel Rolls and One New Paper Roll.

1—60" Shartle & Bevis Waxing Machine. Vacuum Type Water Removal Unit. Variable Speed AC Motor Drive.

1—72" & 1—84" Miami Lo-Type Waxing Machines.

1—80" Potdevin Waxing Machine. Model 79.

2—46" Waldron Brush Coating Machines complete with drying ovens, festoon equipment, rack and so forth.

2—Noble & Wood Mammoth Jr. Jordans. AC motors, direct connected.

1—Electric operated Minnich Baler. Makes bales 24x64x60.

1—46" 6-Roll Holycke Stack of Super Calenders. 4—Metal; 2—Cotton. Complete with drive.

1—#2 Noble & Wood Experimental Beater.

GIBBS-BROWER COMPANY, INC.

Reply to Room 903

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N-23

FOR SALE

GOOD VALUES FOR SALE

48" Kidder model CH Slitter.
32" Cameron model 24-3A Slitter.
52" Cameron 44-W Rewinder.
32" Hobbs Box Slitter.
36" Hamblet Sheeter.
58" Finley Sheeter.
100" Horne Sheeter.
68" Oswego mill type Power Cutter.
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16 and 24-Page Newspaper Presses.

(Send for Current List.)

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Motor driven stack directly connected by Waldron flexible coupling with herringbone gear reduction drive & Kohler system electric hookup.
9 roll stack (Holyoke) 55" wide.
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3 intermediate steel rolls 12" dia. with 6" journals.
3 cotton rolls—14" dia.
1 paper roll—14" dia.
1 steel top roll 16" dia.
Water cooled bearings.
Web frame 17" between guides so intermediate rolls can be removed through sides.
Compound levers and weights.
2 shaft hand revolving rewinder to take 36" diameter roll. Drive consists of D. C. Diehl 75 H.P. Motor 230 V with Cutler Hammer magnetic clutch and Kohler system for variable speed, and 120 H.P. Crocker-Wheeler Motor Generator Set A.C. to D.C. 2300 volts on A.C., 2 phase, 4 wire, converts to 230 D. C.

Address Box 50-569 care Paper Trade Journal. N-3

PRICED FOR IMMEDIATE SALE

One 60 inch 10 roll supercalender stack complete with Westinghouse drive and Foxboro pneumatic loaders. Drive new 1947. Stack completely rebuilt same year. Two-ton traveling bridge crane for servicing stack included.

One 84 inch two-drum rewinder complete with Reliance V.S. drive. All new 1947.

Stack and rewinder excellent condition and ready for actual demonstration.

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N-30

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FOR SALE—500 lb. Economy Baler, Style 148F5, in first class working condition. Available for inspection. Address Box 50-581 care Paper Trade Journal. N-23

FOR SALE

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FORECLOSURE SALE of real estate, machinery and fixtures of PAPER CORPORATION OF AMERICA of Cheboygan, Michigan, will be held at the Court House, Cheboygan, Michigan, on November 30th, 1950, at 2:00 P.M. Property available for inspection after November 15, 1950. Inquiries will be received by mail addressed to box 50-560, care Paper Trade Journal.

N-23

FOR SALE

1—Beloit 115" Board Machine Coater.
1—Valley Micromist Moisture Control for top and bottom applications of water finish on paper machines. 120" decal.

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N-23

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WANTED

WANTED

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N-23

WANTED—Brightwood Box Machine, Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic presses, Sheridan Presses, Dryers. Address Box 50-193 care Paper Trade Journal. TF

WANTED IMMEDIATELY—Spiral Paper Tube or Core Winding Machine, Knowlton, Langston or other make. Also paper core Recutter. Address Box 50-489 care Paper Trade Journal. N-23

WANTED—Bird Paper Machine Screen. Address Box 50-577 care Paper Trade Journal. N-23

WANTED FOR EXPORT—1 Pulp Mill complete, in operating condition. Address Box 50-571 care Paper Trade Journal. D-7

WANTED—Jonsson Screen suitable 20 to 50 tons capacity. Address Box 50-576 care Paper Trade Journal. N-23

WANTED FOR EXPORT—Self opening Bag Machines, to make any sizes. Address Box 50-572 care Paper Trade Journal. D-7

WANTED—Flat Screens. Full description please. Address Box 50-578 care Paper Trade Journal. N-23

WANTED

WANTED

Serviceable Grocery Bag Machine
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Recent Model Potdevin preferred.

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GOVERNMENT BIDS

PROPOSALS

FOR FURNISHING

PAPER AND ENVELOPES FOR THE U. S. GOVERNMENT PRINTING OFFICE

SEALED PROPOSALS will be received until 10 a.m., December 4, 1950, in the room of the Joint Committee on Printing, in the Capitol, Washington, D. C., for furnishing the paper for the public printing and binding, and blank paper and plain envelopes for the use of the Government departments and establishments in the District of Columbia, for the terms of 3 months for paper and 6 months for envelopes beginning January 1, 1951, deliveries to be f. o. b. Government Printing Office Warehouse, or warehouse siding, Washington, D. C. The proposals will be opened in the presence of and the award of contracts made by the Joint Committee on Printing to the lowest and best bidders for the interest of the Government whose bids are in conformity with the requirements of the proposals. The Committee reserves the right to reject any or all bids, or to accept any bid or any part and reject the other part, if, in its opinion, such action would be in the interest of the Government.

Blank proposals containing the instructions, schedule, and specifications may be obtained by addressing John J. Deviny, Public Printer, Washington, D. C.

Contracts will be entered into for supplying the quantities required, whether more or less than the estimates, as provided in paragraph 15 of the proposal for paper and paragraph 13 of the proposal for envelopes.

The approximate estimated quantities set forth in detail in the schedules comprise:

PAPER

2,000,000 pounds newsprint paper; 2,560,000 pounds machine-finish book paper; 20,000 pounds english-finish book paper; 30,000 pounds machine-finish book end paper; 120,000 pounds lightweight machine-finish book paper; 2,905,000 pounds offset book paper; 320,000 pounds antique book paper; 120,000 pounds water resistant (text) book paper; 900,000 pounds supercalendered book paper; 1,404,000 pounds coated book paper; 1,720,000 pounds mimeograph paper; 615,000 pounds duplicator copy paper; 7,725,000 pounds writing paper; 1,090,000 pounds map paper; 415,000 pounds manifold paper; 2,054,000 pounds bond paper; 884,000 pounds ledger paper; 675,00 pounds index paper; 210,000 pounds cover paper; 5,000 sheets cloth-lined cover paper; 60,000 pounds manila paper; 345,000 pounds kraft paper; 170,000 sheets gummed paper; 40,000 pounds blotting paper; 5,000 pounds wallet board; 55,000 pounds tag board; 10,000 pounds cardboard; 25,000 sheets railroad board; 150,000 pounds wood cardboard; 150,000 pounds tan board; 5,340,000 pounds postal card paper; 45,000 sheets pressboard; 60,000 pounds newsboard; 50,000 pounds binder's board; 70,000 pounds chestnut cover board.

In cases where more than 1,000 reams are called for, proposals will be received for 1,000 reams or more.

ENVELOPES

The approximate estimated quantities set forth in detail in the schedule comprise:

22,570,000 Kraft; 6,700,000 Writing, Chemical Wood, white and colored; 70,000 100% Writing, White; 400,000 25% Bond, White; 290,000 100% Bond, White.

By direction of the Joint Committee on Printing.

JOHN DEVINY,
Public Printer.

WASHINGTON, D. C.
November 13, 1950. N-30

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Monsanto Chemical Co.
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Nopco Chemical Co.
Paisley Products, Inc.
Stein, Hall & Co., Inc.

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Hardinge Company, Inc.
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D. J. Murray Mfg. Co.
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Valley Iron Works Co.
Shartle Brothers Machine Co.

ADJUSTABLE SHAKE MOTION
Manchester Machine Co.

ALLOYS
Michigan Steel Casting Co.

ANTIFOAM
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National Aluminate Corp.
Nopco Chemical Co.

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Williams-Gray Co.

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Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Smith Winchester Mfg. Co.
Weber, Herman G., & Co., Inc.

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Nichols Engrg. & Research Corp.

BARK PRESS
American Defibrator Co.

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Carthage Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Works Co.

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The Moore & White Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

BASIC WEIGHT SCALES
Thwing-Albert Instrument Co.

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Magnus Metal Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Timken Roller Bearing Co.
Valley Iron Works Co.

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Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Morden Machines Co.
J. J. Ross Company
Ross Paper Machy. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

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Bahr Brothers Mfg. Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Lukenweld Div., Lukens Steel Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

BELTING
Alexander Brothers
Allis-Chalmers Mfg. Co.
The Goodyear Tire & Rubber Company
Link Belt Company

BLEACHING AGENTS
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Rohm & Haas Co.
Virginia Smelting Co.

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Moore & White Co.
Niagara Alkali Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

BLOW PIPES & PITS
Carthage Machine Co.
Kalamazoo Tank & Silo Co.
Moore & White Co.
Murray Mfg. Co., D. J.
Walworth Company

BOILERS
Babcock & Wilcox Co.

BOTTOMS
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Valley Iron Works Co.

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Thwing-Albert Instrument Co.

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BRUSHES
M. W. Jenkins Sons, Inc.
Gus Reidel & Son

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Testing Machines, Inc.

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Lobdell Co.
Edward J. McBride
The Moore & White Co.
Perkins & Sons, Inc., B. F.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

CARRIER ROPE
Williams Gray Co.

CASEIN
American Cyanamid Co. Industrial Chem. Div.
Bunge Pulp & Paper Co.
Hercules Powder Co.

CASTINGS
Appleton Machine Co.
Black Clawson Company
Babcock & Wilcox Co.
Carthage Machine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Hamblett Machine Co.
Hardinge Company, Inc.
Lobdell Co.
Magnus Metal Corp.
Michigan Steel Casting Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

WHERE TO BUY

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Valley Iron Works Co.
Walworth Company

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Bird Machine Co.
Nichols Engrg. & Research Corp.
Ross, J. O., Engrg. Co.
Shartle Brothers Machine Co.

CHAINS
Link Belt Company

CHEMICAL COTTON PULP
Hercules Powder Co.

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Calco Chemical Co.
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Cowles Chemical Company
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Dow Chemical Company
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Geigy Co., Inc.
B. F. Goodrich Chemical Co.
Gottesman & Co.
Hercules Powder Co.
Hooker Electrochemical Co.
The Kinsley Chemical Company
Monsanto Chemical Company
National Aluminate Corp.
Niagara Alkali Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Rohm & Haas Co.
Solvay Sales Corp.
Virginia Smelting Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

CHESTS
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Kalamazoo Tank & Silo Co.
Shartle Bros. Mch. Co.

CHUCKS
Efficiency Engrg. Co.

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The Dow Chemical Company
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General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co.
Solvay Sales Corp.
Wyandotte Chemicals Corp., J. B. Ford Division

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Hardinge Company, Inc.
Hudson Sharp Machine Co.
Rodney Hunt Machine Co.
Link Belt Company
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.

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Gibbs-Brower Company, Inc.
Hudson Sharp Machine Co.
The Mayer Machine Co., Inc.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G., & Co., Inc.

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The Goodyear Tire & Rubber Company
Hercules Powder Co.
J. M. Huber Corp.
Monsanto Chemical Company
National Wax Co.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Ebasco Services
Vance P. Edwardes
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Hudson-Sharp Machine Co.

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Link Belt Company
Murray, D. J., Mfg. Co.
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Shartle Brothers Mch. Co.

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Link Belt Company
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Waldron Corp., John

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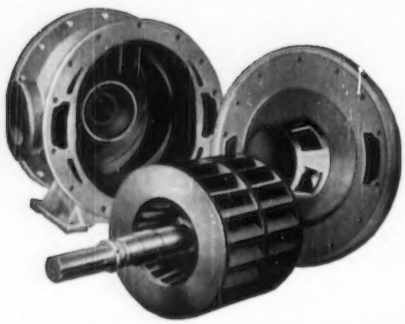

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Kinsley Chemical Co.
Roderick O'Donoghue
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Cowles Chemical Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DEWAXING CHEMICALS
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

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Thwing-Albert Instrument Co.

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Chicago Bridge & Iron Co.
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Pusey & Jones Corp.

DIGESTERS (Continuous)
Paper & Industrial Appliances

DIRTEC
Bird Machine Co.

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General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DOCTORS
Bird Machine Company
Black Clawson Company
Downingtown Mfg. Co.
Lobdell Co.
Lodding Engineering Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
Bird Machine Company
Lodding Engrg. Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DRIERS
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Hardinge Company, Inc.
Lukenweld
The Moore & White Co.
Murray Mfg. Co., D. J.
J. J. Ross Company
Red-Ray Mfg. Co., Inc.
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

DRILLED SUCTION COUCH ROLLS
Manchester Machine Co.

DRILLED SUCTION DRUM ROLLS
Manchester Machine Co.

DRIVES
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Bird Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Farrel-Birmingham Co.
General Electric Company
Gibbs Brower Company, Inc.
Rodney Hunt Machine Co.
Link Belt Company
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

DRUM WINDERS
Manchester Machine Co.

DRYER DRAINAGE
Stickle Steam Specialties Co.

DRYER ROLL PYROMETER
Thwing-Albert Instrument Co.

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
M. W. Jenkins Sons, Inc.
E. D. Jones & Son Co.
Moore & White Co.
D. J. Murray Mfg. Co.
John Waldron Corp.

DUSTING BRUSHES
M. W. Jenkins Sons, Inc.

DYESTUFFS
American Cyanamid Company, Calco Chemical Div.
Bunge Pulp & Paper Co.
Ciba Company
E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
General Dyestuffs Corp.
National Aniline Division, Allied Chemical & Dye Corp.

ELECTRIC HYGROMETER
Thwing-Albert Instrument Co.

EMBOSSING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
John Waldron Corp.

EMBOSSING ROLLS
The Appleton Machine Co.
Gibbs-Brower Company, Inc.
Northern Engraving & Mch. Co.
B. F. Perkins & Son, Inc.
John Waldron Corp.
Wheeler Roll Co.

EMULSIFIERS
General Dyestuff Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wallerstein Co., Inc.

EVAPORATORS
Davis Engrg. Corp.
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

EXPANDERS
Mount Hope Machinery Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FEEDERS
Hardinge Company, Inc.
Leeds & Northrup
Merrick Scale Mfg. Co.
The Permutit Company

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Draper Bros. Corp.
Huyck & Son, F. C.
Lockport Felt Co.
Morey Paper Mill Supply Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.
Williams-Gray Co.

FELT CLEANERS
Calgon, Inc.
Cowles Chemical Co.
General Dyestuff Corp.
Nopco Chemical Co.

FELT CONDITIONERS
Bird Machine Co.
The Sandy Hill Iron & Brass Works

FELT GUIDES
Black Clawson Company
Frank W. Egan & Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS
American Cyanamid Company, Industrial Chemicals Division
A. M. Meincke & Son, Inc.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

FILTERS
Bird Machine Company
Green Bay Fdy. & Mch. Co.
Hardinge Company, Inc.
J. M. Huber Corp.
Hungerford & Terry, Inc.
Johnson Corp.
Moore & White Co.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Walworth Company

FITTINGS
Crane Company
Shartle Bros. Mch. Co.
Walworth Company

FLEXIBLE COUPLINGS
Egan, Frank W., & Co.
John Waldron Corp.

FLOORING, GRATING AND TREADS
The Goodyear Tire & Rubber Company
Norton Co.

FLOW BOXES, STAINLESS-CLAD
Lukens Steel Co.
The Sandy Hill Iron & Brass Works

FORK LIFT TRUCKS
Towmotor Corp.

FORMATION
Thwing-Albert Instrument Co.

FORMING MACHINES
Black Clawson Company
Downingtown Mfg. Co.
The Moore & White Co.
Nobbe & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

FREENESS TESTERS
Testing Machines, Inc.

GASKETS
The Goodyear Tire & Rubber Company

GEARS
Black Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Link Belt Company
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
Western Gear Works

GRINDERS
Bridgeport Safety Emery Wheel Company
Carthage Machine Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
Norton Company

GUIDES, WEB
Egan, Frank W., & Co.
The Moore & White Co.
Mount Hope Machinery Co.
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works

GUMS
National Starch Products, Inc.
Stein-Hall Co., Inc.

HEADS
Babcock & Wilcox Co.
Lukens Steel Company

HEAT EXCHANGERS AND RECOVERY SYSTEMS
Davis Engrg. Corp.
Stickle Steam Specialties Co.
Westinghouse Electric Corp.

HEATING, VENTILATING & AIR CONDITIONING
The Appleton Machine Co.
Davis Engrg. Corp.
E. D. Jones & Sons Co.
General Electric Co.
Leeds & Northrup
D. J. Murray Mfg. Co.
Red-Ray Mfg. Co., Inc.
Ross Engineering Corp., J. O.
Stickle Steam Specialties Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

HOSE (Air, Water, Suction, etc.)
The Goodyear Tire & Rubber Company

HUMECTANTS
Aktivin Division, Heyden Chemical Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
American Cyanamid Company Industrial Chemicals Division
B. F. Goodrich Chemical Co.

INDENTING MACHINES
Dilts Machine Works

INDUSTRIAL TRACTORS
Towmotor Corp.

INKOMETER
Thwing-Albert Instrument Co.

INSTRUMENTS, TESTING AND MEASURING
Bauer Brothers Co.
Beckman Instruments, Inc.
Bunge Pulp & Paper Co.
N. P. Bowsher
General Electric Company
W. & L. E. Gurley
National Technical Laboratories
B. F. Perkins & Son
Photovolt Corp.
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

JOINTS
Johnson Corp.
Shartle Bros. Mch. Co.

JORDAN FILLINGS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
Heppenstall Company
E. D. Jones & Sons Co.
The Moore & White Co.
Taylor Stiles & Co.
Valley Iron Works Co.

KNOT BORING MACHINES
DeZurik Shower Company

KRAFT WRAPPING PAPERS
Canadian Newsprint Supply Co.

LABORATORY CORRUGATOR
Thwing-Albert Instrument Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
Bauer Brothers Co.
Beckman Instruments, Inc.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories

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Manchester Machine Co.

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Moore & White Co.
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J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
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The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

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Hudson Sharp Machine Co.
Langston Co., Samuel M.

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National Wax Company

PARAFFIN WAX EMULSIONS
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Potdevin Machine Co.
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Shartle Brothers Machine Co.
Waldron Corp., John

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Crane Company
Michigan Steel Casting Co.
Walworth Co.

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W. H. Brady Co.

PITCH CONTROL
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.

PLASTICIZERS
American Cyanamid Company Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Nopco Chemical Co.

PLATERS
Gibbs-Brower Company, Inc.
Perkins & Son, Inc., B. F.

PLATES
Armco Steel Corp.
Babcock & Wilcox Co.
J. O. Ross Engrg. Corp.
Lukenweld Division
Lukens Steel Company
Timken Roller Bearing Co

PLUGS
The Appleton Machine Co.
Black Clawson Company
E. D. Jones & Sons Co.
Shartle Brothers Machine Co.

POPE TYPE REELS
Egan, Frank W., & Co.
Manchester Machine Co.

PRECISION SAMPLE CUTTER
Testing Machines, Inc.
Thwing-Albert Instrument Co.

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General Dyestuff Corp.

PRESSURE VESSELS STEEL AND ALLOY
Babcock & Wilcox Co.

PRESSURE VESSELS
Chicago Bridge & Iron Co.

PRESSES
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Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson Sharp Machine Co.
The Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
Williams Apparatus Co.

PULP CLASSIFIER
The Bauer Bros. Co.
Thwing-Albert Instrument Co.

PULP CLEANERS
Nichols Engrg. & Research Corp.

PULP STOCK VALVES
Crane Company
Record Fdy. & Mach. Co.
Shartle Brothers Machine Co.

PULPERS
American Paper Machy. & Engrg Works, Inc.
Bauer Brothers Co.
Dilts Machine Works
E. D. Jones & Sons Co.
Shartle Brothers Machine Co.

PULPS
Brown Company
Bunge Pulp & Paper Co.
Gottesman & Co., Inc.
Lyddon & Co. (America), Inc.
Parsons & Whittemore, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.
Restigouche Co., Ltd.

PULPSTONES
Norton Company

PULP TESTERS
Paper and Pulp Testing Laboratories

PULVERIZING MILLS
F. L. Smidth & Co.

PUMPS
American Paper Machy. & Engrg. Works, Inc.
Allis-Chalmers Mfg. Co.
Black Clawson Company
DeLaval Steam Turbine Co.
Dorr Company
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Gibbs-Brower Company, Inc.
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Roots Connersville Blower Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

RADIANT BURNERS
Red-Ray Mfg. Co., Inc.

RAG COOKING PROCESSES
The Kinsley Chemical Company
General Dyestuff Corp.
Rohm & Haas Co.

RAG CUTTERS
Gibbs Brower Company, Inc.
B. F. Perkins & Son, Inc.
Taylor-Stiles & Co.

RECAUSTICIZING PLANTS
The Dorr Company

RECOVERY SYSTEMS
Babcock & Wilcox Co.
Chicago Bridge & Iron Co.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones Corp.
Ross Engineering Corp., J. O.
Valley Iron Works Co.

REELS
The Appleton Machine Co.
Black Clawson Company
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Downingtown Mfg. Co.
Hudson Sharp Machine Co.
Moore & White Co.
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg Co.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
Gibbs-Brower Company, Inc.
Anton J. Haug
E. D. Jones & Sons Co.
Morden Machines Co.
Murray, D. J., Mfg. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
American Paper Machy. & Engrg Works, Inc.
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
DeZurik Shower Company
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Taylor Instrument Companies
Wallace & Tiernan

RESINS
American Cyanamid Company, Plastics & Resins Division
The Dow Chemical Company
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co., Resinous Products Div.

ROLLS
Appleton Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell Co.
The Moore & White Co.
D. J. Murray Mfg. Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Co.
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
U. S. Rubber Co.
Valley Iron Works Co.
Waldron Corp., John
Wheeler Roll Co.

ROLL COVERS
The Goodyear Tire & Rubber Company
Stowe-Woodward, Inc.

ROLL HANDLING EQUIPMENT
Dilts Machine Works (Kohler Systems)

ROLL STANDS
Cameron Machine Co.
Dilts Machine Works (Kohler Systems)
Frank W. Egan & Co.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.
H. G. Weber & Co., Inc.

ROPE CARRIERS
Black Clawson Co.
The Moore & White Co.
The Sandy Hill Iron & Brass Works

ROTARY KILNS
F. L. Smidth & Co.

ROTARY STEAM JOINTS
Johnson Corp.
The Moore & White Co.
Shartle Bros. Mch. Co.

RUBBER PRODUCTS
The Goodyear Tire & Rubber Company

SATURANTS
B. F. Goodrich Chemical Co.

SATURATING MACHINES
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

SAVEALLS
Bird Machine Company
Chicago Bridge & Iron Co.
Green Bay Fdy. & Mch. Wks.
Hardinge Company

SCALES
Fairbanks, Morse & Co.
Merrick Scale Mfg. Co.
Testing Machines, Inc.

SCREEN PLATES
Bird Machine Company
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Testing Machines, Inc.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Company
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Green Bay Fdy. & Mch. Co.
E. D. Jones & Sons Co.
Link Belt Company

Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

SHEET MACHINES
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Valley Iron Works Co.

SHOWER PIPES
Bird Machine Company
DeZurik Shower Company
Downingtown Mfg. Co.
Moore & White Co.
Sandusky Fdy. & Mch. Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.
Gibbs Brower Company, Inc.

SIZE PRESSES
Manchester Machine Co.

SIZING
American Cyanamid Company, Industrial Chemicals Division
The Dow Chemical Company
du Pont, E. I., de Nemours & Co.
Hercules Powder Co.
The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Stein-Hall Co., Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SIZING TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SLIME CONTROL
The Dow Chemical Company
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SLITTERS
Black Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Dietz Machine Works
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson Sharp Machine Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SMOKE STACKS
Chicago Bridge & Iron Co.

SOFTNESS-STIFFNESS TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SOLUBLE OILS
American Cyanamid Company, Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

SPECIAL MACHINERY
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.

SPLICING TISSUE
Bunge Pulp & Paper Co.
Williams-Gray Co.

STAINLESS STEEL
Armco Steel Corp.
Michigan Steel Casting Co.
U. S. Steel Corp.

STARCH
A. M. Meincke & Son, Inc.
Clinton Foods, Inc.
The Hubinger Co.
National Starch Products Inc.
Stein-Hall Co., Inc.

STEAM JOINTS
The Moore & White Co.
Shartle Bros. Mch. Co.

STEAM SPECIALTIES
Babcock & Wilcox Co.
Combustion Engrg. Co., Inc.
Davis Engrg. Corp.
Johnson Corp.
Stickle Steam Specialties Co.

STEEL
Armco Steel Corp.
Carnegie Illinois Steel Co.
Lukens Steel Company
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
U. S. Steel Corp.

STEEL, CLAD
Babcock & Wilcox Co.
Lukens Steel Company

STEEL TANKS
Chicago Bridge & Iron Co.
The Sandy Hill Iron & Brass Works

STRETCH TESTER
Thwing-Albert Instrument Co.

STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

SUCTION BOXES
Black Clawson Company
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

SULPHITE SPECIALTIES
Canadian Newsprint Supply Co.

SULPHUR
Texas Gulf Sulphur Co.

SULPHUR BURNERS
Valley Iron Works Co.

SULPHUR DIOXIDE
American Cyanamid Company, Calco Chemical Div.
Virginia Smelting Co.

SUPERCALENDERS
The Appleton Machine Co.
B. F. Perkins & Son, Inc.

SYNTHETIC LATICES
American Cyanamid Company Industrial Chemicals Division
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Nopco Chemical Co.

TAKE OFF UNITS
Dilts Machine Works (Kohler Systems)

TALC
American Cyanamid Company, Industrial Chemicals Division
Vanderbilt Co., R. T.

TANKS
Chicago Bridge & Iron Co.
Kalamazoo Tank & Silo Co.
B. F. Perkins & Sons, Inc.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

TEARING TESTERS
Thwing-Albert Instrument Co.
Testing Machines, Inc.

TENSILE TESTERS
Bunge Pulp & Paper Co.
Thwing-Albert Instrument Co.
B. F. Perkins & Son, Inc.
Testing Machines, Inc.
Nopco Chemical Co.

THICKENERS, DECKERS AND SAVEALLS
The Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Chicago Bridge & Iron Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Green Bay Fdy. & Mch. Co.
Hardinge Co., Inc.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
American Cyanamid Co., Calco Chemical Div.
E. I. du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.

TOOLS
Walworth Company

TRACTORS AND TRUCKS
Towmotor Corp.

TRANSMISSIONS
Link Belt Company

TRAPS
Crane Co.
Johnson Corporation
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

TUBE MILLS
F. L. Smidth & Co.

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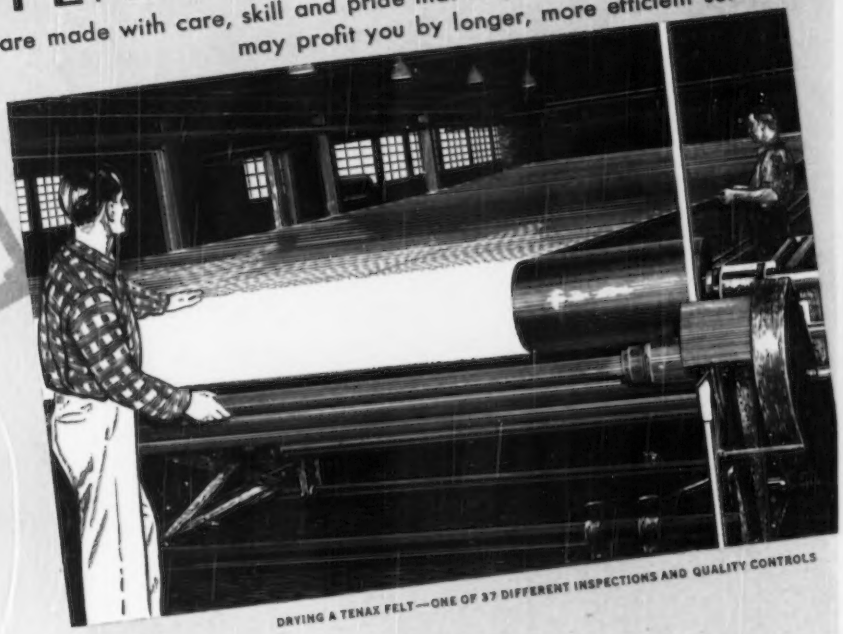

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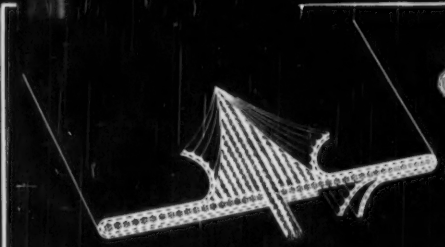

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